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starting **1** points in mathematics teacher's edition



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Teacher's Edition for

starting points in mathematics

Revised

Mathematics Team

Level 1

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In each Teacher's Edition of *Starting Points in Mathematics*, the pages for the student's book are referred to by numeral only, while pages in the teacher's edition are designated by the letter T and a numeral.

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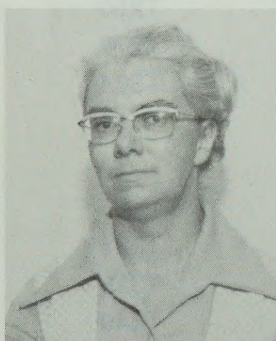
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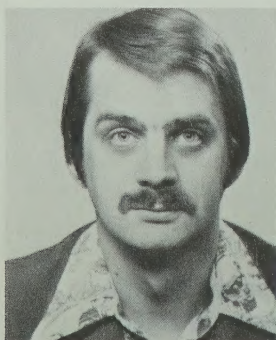
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Authors and Consultants



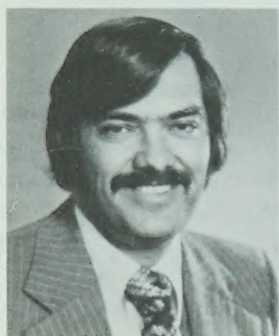
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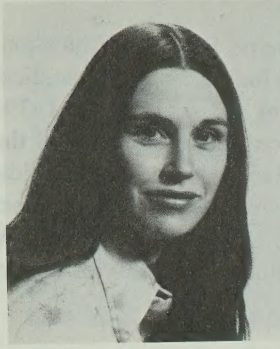
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Authors and Consultants



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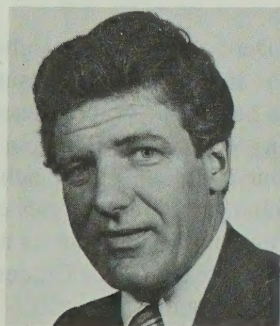
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Ed is currently teaching mathematics at Antigonish Regional High School. Prior to his present teaching responsibilities, he has been an elementary school principal for sixteen years, a Past President of the Nova Scotia Mathematics Teachers Association, and a lecturer in elementary mathematics at St. Francis Xavier University. He was the Canadian representative for the National Council of Teachers of Mathematics from 1972 to 1975 and has been active in mathematics throughout his home province of Nova Scotia for many years. He has worked on the program in planning its development and evaluating manuscript.



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Paul is currently teaching mathematics at Barrie North Collegiate Institute in Barrie, Ontario. A graduate of Lakeshore Teachers College, Toronto, he has many years of experience in elementary and high school mathematics classrooms. He has been active in curriculum planning as project director of "Recommendations for Intermediate Mathematics for the Province of Ontario", a Ministry of Education publication, and as a member of the writing team for the Intermediate guidelines established by the Ministry of Education. At the present time, he is a director of the Ontario Association of Mathematics Education. He has worked on the program in planning its development, evaluating manuscript, and as an author of material for Grades 4 to 6.



Trudy Stacey

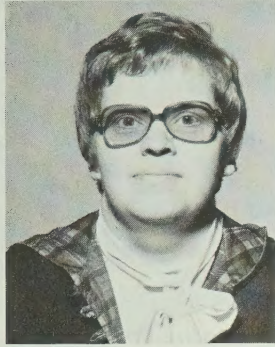
Trudy has a Bachelor of Arts degree from York University. She has been an elementary teacher and is currently a General Consultant for the North York Board of Education and Program Leader in Language Arts and Mathematics. She developed the themes for the primary phase of the program.

Authors and Consultants



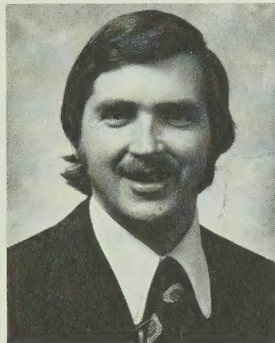
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Stewart has Bachelor degrees in Arts and Education from the University of New Brunswick and is currently teaching at the Magnetic Hill School in Moncton. He has served in many capacities in the province: as a member of the Provincial Committees in Mathematics and Science; as Conference Chairman for the Association Subject Council Workshop; as President and Workshop Co-ordinator for Elementary Teachers' Council. He continues to remain active in numerous presentations in his home province, in other centres in Canada, and in the United States. He has worked on the Grades 3 to 6 phase of the program in planning its development, evaluating manuscript, and co-ordinating and evaluating field-test material prior to publication.



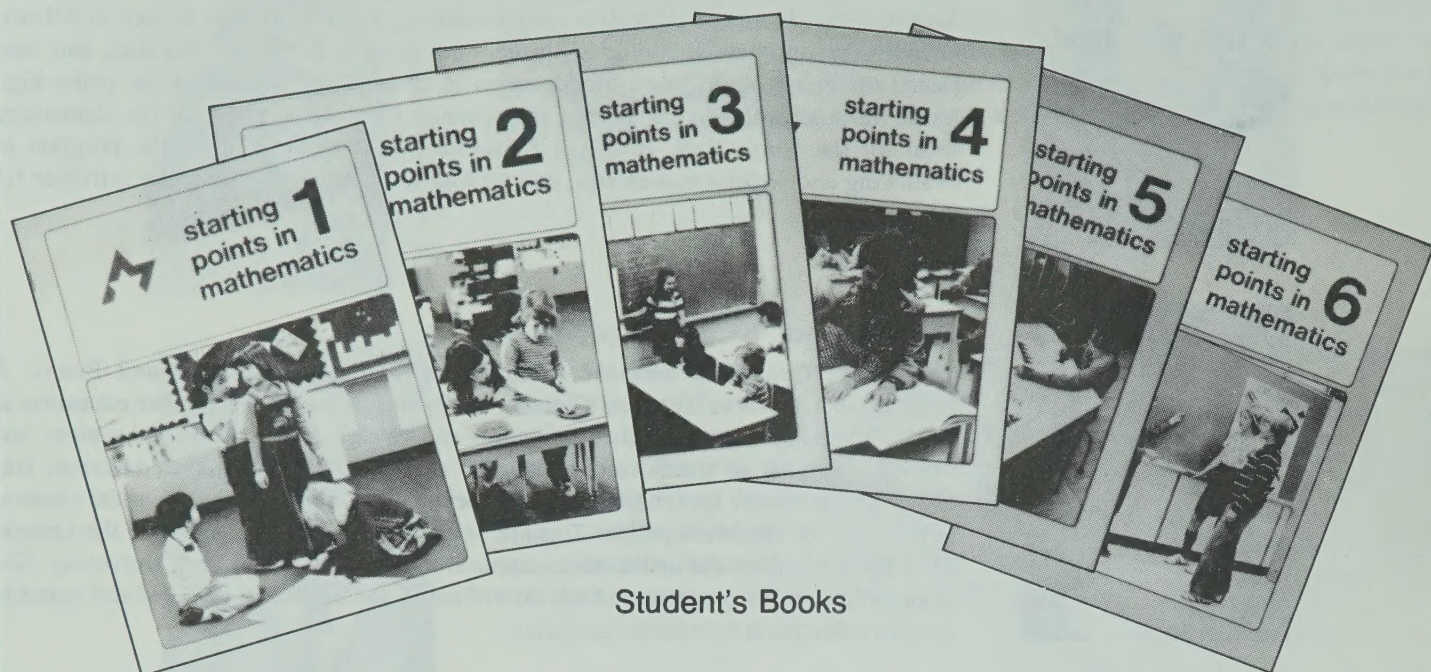
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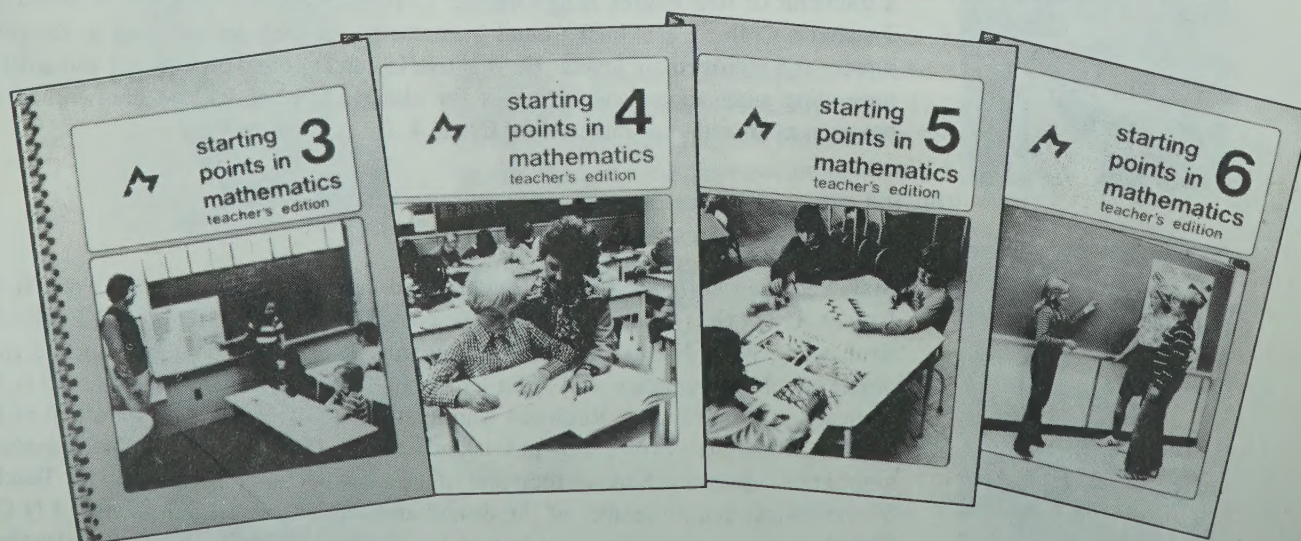
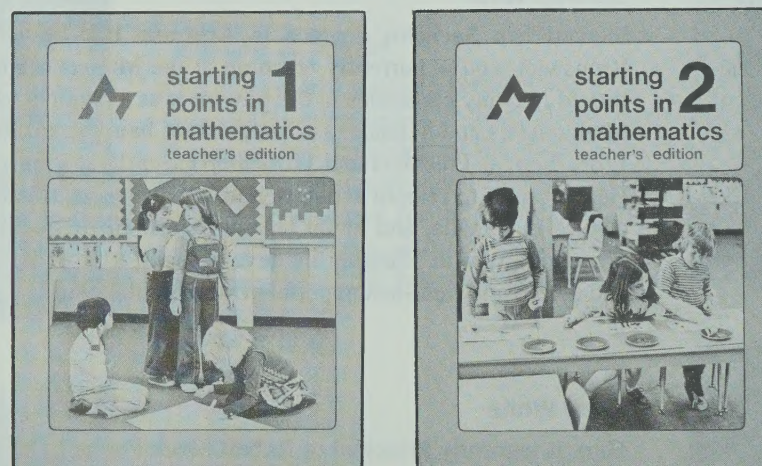
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Student's Books

Teacher's Editions



Program Highlights

Content

- Computation strands that maintain a balance between concepts and skills
- A metric Measurement strand using units and symbols in accordance with the National Standards of Canada
- A Decimals and Fractions strand that reflects the more significant role of decimals in a metric world
- A Geometry strand that introduces transformation geometry topics in addition to the more traditional topics
- A Problem Solving strand that identifies specific problem solving skills and strategies
- Lessons on using a calculator to reinforce the understanding of number operations and as an aid for checking results

Development

- Computational concepts and skills built upon the basic facts, the continued manipulation of concrete materials, place value, systematic development of the algorithms, and practice
- Measurement concepts and skills introduced using non-standard units; refined and developed using only approved metric units
- Decimals introduced with the parts-of-a-whole concept and developed by extending the place-value concepts of whole numbers
- Corresponding ideas among the Numeration, Computation, Measurement, and Decimals strands treated as mutually supportive concepts for both development and reinforcement
- Problem Solving strand integrated with the other strands
- Material provided for maintenance of computational skills

For the Student

- A highly visual program placing mathematics ideas and experiences within meaningful settings of real-life objects and situations
- Uniform lesson structure with completed examples to illustrate each objective
- A variety of types of exercises
- Problems that provide reasons for learning mathematics
- *Special Features* showing mathematics in use in real-life situations and providing opportunities to be individually creative with mathematical skills in problem solving and enrichment activities

For the Teacher

- Manageable units for the development of concepts and skills
- Overviews that provide mathematics background and summarize the content of each unit
- Concise statements of lesson objectives
- Suggestions for activities to precede and follow each lesson in the book; suggestions for teaching each lesson in the book
- Uniform lesson structure that is adaptable to a variety of classroom strategies
- Unit themes that support the integration of mathematics with other areas of study, and suggestions on how this integration can be achieved
- Component skills necessary for achieving lesson objectives identified
- Assessment materials included in the book and the teacher's edition

Features of the Student's Book


A minimum amount of reading is required on each page.

Color and design are used to assist understanding.

Pages are designed to arouse interest and provide motivation.

A worked example indicates how the children are to record their answers.

Match and mark.



14 (fourteen)

Understanding the concept *more than* through matching

The student's book can offer only one part of a complete mathematics program. About half the children's time should be spent on activities before and after using the page.

The development of a concept enables the child to move from the use of concrete materials to the use of abstract number sentences and algorithms.

A spiral organization of the contents in the units of the Grade 1 program provides for reteaching and review.

Games and Activities

Poem for page 85

There was an old man who said, "Do
Tell me *how* I should add two and two?
I think more and more
That it makes about four -
But I fear that is almost too few."

Poem for page 93

Five little ducks went swimming one day,
Over the pond and far away.
Mother Duck said, "Quack, quack, quack, quack."
But only four little ducks came back.

Four little ducks went swimming one day,
Over the pond . . .

Last verse:

One little duck went swimming one day,
Over the pond and far away.
Mother Duck says, "Quack, quack, quack, quack."
And five little ducks come swimming back.

Activity for page 98

Prepare three cubes to be used as dice. Mark or glue red dots on the first die to show 9, 9, 8, 7, 6, and 5. Mark or glue blue dots on the second die to show 5, 4, 3, 2, 1, and 0. Mark the third die to show *minus*, $-$, *minus*, $-$, *minus*, $-$. Identify it so that it can be referred to as the white die.

Ask one child to roll the dice. Ask another child to place them in the order of red, white, and blue. If the dice show 9, $-$, and 4, for example, ask another child to write $9 - 4$ on the chalkboard. Have all the children draw the sets and write the subtraction sentence $9 - 4 = 5$. Ask a child to complete the sentence on the chalkboard.

Ask another child to roll the dice and have other children repeat the procedure.



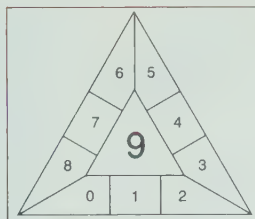
$9 - 4$



Lucky Nine (Game for page 105)

Materials

a game board as shown below
ten markers for each player
domino cards such that the sum of the two numbers represented on the card is less than 10



Rules

1. The domino cards are turned face down.
2. The first of two or three players turns a domino card face up and states the corresponding addition sentence, for example,

$$6 + 2 = 8 \text{ for}$$

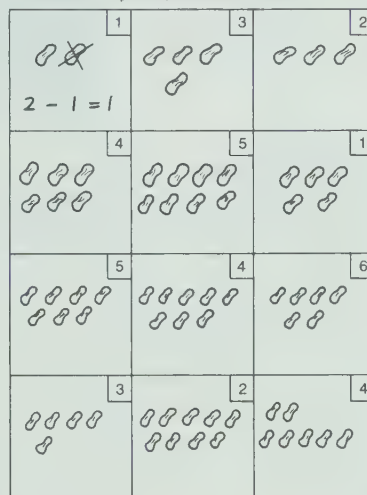


and places a marker on the space for 8 on the game board. If there is a marker on the space for 8 already, the player removes it and places it in her/his pile of markers, instead of placing a marker there.

3. A player who obtains a domino card for 9 claims all the markers on the game board.
4. The game ends when one player has no more markers.
5. The winner is the player with the most markers.

Eating Nuts (Activity for page 106)

Have the children pretend to eat nuts by marking X's on nuts as indicated by the number in the upper right corner. Then have them write the corresponding subtraction sentence.



T 137

The instructions along the side of a page are for the teacher to use when telling the children what they are to do for that page.

The content caption at the bottom of each page alerts the teacher to the mathematical content presented on that page.

Word problems whose solutions incorporate the skills taught are included.

Frequent practice exercises are provided after understanding has been established.

Checkup

End-of-unit lessons provide a check of the understanding of the work of the unit.

Year-End Checkup

The last four pages in the student's book provide a check that concentrates on the major number concepts and operations developed in Book 1.

A lesson outline may include some or all of the following:

- 1 The page reference to the student's book
- 2 The outcome(s) for the lesson
- 3 Some of the materials that would be desirable for introducing and developing the lesson
- 4 A reference to a page that may be copied to provide cutouts for the children
- 5 Mathematical terms used for the first time and other words useful for discussing the development of the topic on the page
- 6 Activities for developing the lesson concepts, and suggestions for introducing new words and symbols
- 7 Suggestions for using the page

1 Page 50


2 LESSON OUTCOME
Recognize a set of eight; recognize and print the numeral 8; recognize the word *eight*

3 Materials
display board and cutouts, Unifix cubes; a sheet of paper for printing 8, a strip for printing 8 from copies of page T335, and an index card for each child

4 Vocabulary
eight

5 RELATED ACTIVITIES

- Have the children continue their number charts by drawing or pasting pictures of eight objects, printing 8 beside them, and pasting a strip of paper showing the word *eight* beside the numeral 8.
- Give each child eight toothpicks, a piece of paper, and glue. Have the children create shapes or patterns using the eight toothpicks.



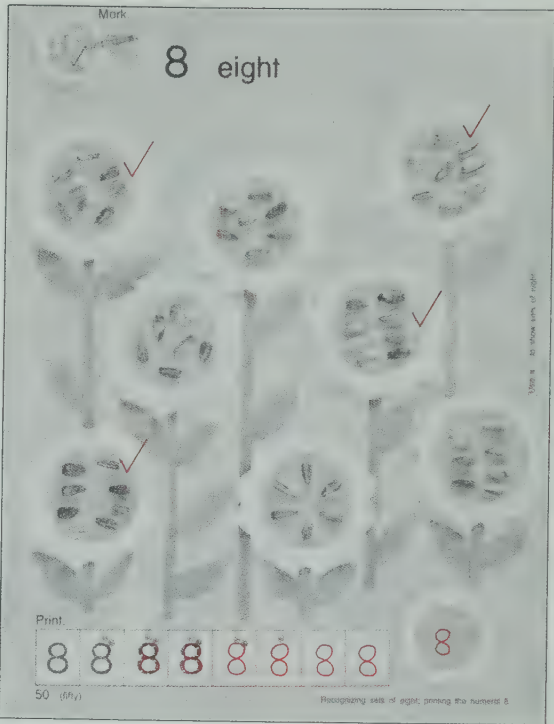
6 LESSON ACTIVITY

Before Using the Page

- Place cutouts, one at a time, in a row on the display board. After placing each cutout, ask a child to tell how many there are. Continue until there are seven cutouts. Include another one and introduce the word *eight*. Place the numeral 8 beside the cutouts. Ask one child to point to each cutout in turn and have the other children count from one to eight.
- Have children use Unifix cubes to make sets for one to eight. Ask the children to arrange the connected cubes according to their lengths (from shortest to longest).
- Draw a set of eight objects on the chalkboard. Ask how many objects there are in the set. Print the numeral 8 beside it, following the sequence shown on page 50. Have the children use hand and arm movements to form 8's in the air.
- Give each child a sheet of paper marked as shown. Have the children begin at the dot, follow the dashes, and stop at the star. You may wish to have the children use pipe cleaners or Plasticine to make 8's.

7 Using the Page

- Have the children count to find out how many white seeds there are in the set at the top of the page. Have them point to the numeral 8 and read the word *eight*. Have the children mark only the sets that show eight seeds. Remind them to count carefully before they decide to mark or not mark a set.
- Have the children trace over the two broken 8's and then practise on their own to complete the row. Give each child a strip for printing 8 from copies of page T335. When the children finish practising, ask them to print or paste their best 8 on the flower.
- After the children have completed the page, ask them to find the two sets that have only six seeds in each. Ask them how many flowers on the page show dark seeds.



Overviews

The overview at the beginning of each unit includes a list of the outcomes for the developmental lessons in the unit, mathematical background, comments about the content and how the unit fits with the other units in the program, teaching strategies, materials, and vocabulary.

Themes

At the beginning of each unit, activities are suggested for integrating the theme of that unit with language, mathematics, science, social studies, art, movement, and music.

OBJECTIVE

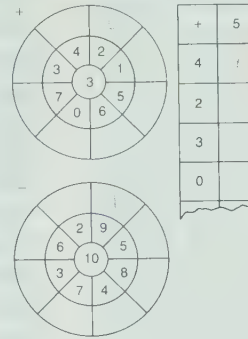
Complete basic addition and subtraction facts, sums and minuends to 10

Materials

ten counters such as transparent bingo chips, overhead projector

RELATED ACTIVITIES

- Provide the children with copies of page T338. Have them complete number wheels and tables similar to the following for further practice in addition and subtraction.



Write the related facts.

4 5 9 $5+4=9$
 9 5 4 $9-5=4$

7+3=10 3+7=10
 10-3=7 10-7=3

8+1=9 1+8=9
 9-1=8 9-8=1

6+4=10 4+6=10
 10-4=6 10-6=4

4	6	8	10	5
9	7	5	3	1
6	6	6	6	9
5	3	9	1	2

LESSON ACTIVITY

Before Using the Page

- Display nine counters on the overhead projector. Ask a child to separate the counters into two groups and tell how many there are in each group. Ask for an addition sentence that describes the situation and write it on the chalkboard. Elicit from the children another addition sentence and two subtraction sentences to obtain the four related facts.

Repeat the procedure for several number combinations for sums of 9. Then adapt the activity for the number combinations for sums of 10.

Using the Page

- Direct the children's attention to the first group of rockets at the top of the page. Ask how many rockets there are and have the children trace over the dotted 4. Ask how many rockets there are in the second group and have the children trace over the dotted 5. Ask how many rockets there are in all and have the children trace over the dotted 9. Use a similar procedure for $9-5=4$. Point out that there will be one more addition

sentence and one more subtraction sentence for the numbers 4, 5, and 9. You may wish to discuss the other illustrations to ensure that the children understand what is required.

- For the second part of the page, caution the children to note whether the operation indicated is addition or subtraction.

8 Reduced pages from the student's book with answers indicated

9 Suggested activities and games which may be used to reinforce, extend, or enrich a particular topic

10 Illustrations of suggested materials

Answers

Answers for the exercises are given on each reduced page from the student's book.

Other Materials

- Games and Teaching Aids
- Pages for Reproduction
- Year-End Evaluation Chart
- Index for Student's Book

Using the Introductory Material

Knowing what the *Starting Points in Mathematics* program can do and what it cannot do is an important place to begin. There are two features to help you. First, the Scope and Sequence chart shows the content by grade level and allows you to locate particular topics in the overall development. Second, each unit begins with an overview and a suggested thematic approach. The overview summarizes the content of the unit, includes mathematics background for the teacher, and suggests strategies for class organization and teaching.

Presenting the Lessons

The organization of the teaching suggestions for each lesson has built-in strategies to motivate and teach, and for practice and application. The *Before Using the Page* section contains suggestions to motivate children through activities and, wherever possible, includes a concrete setting as a basis for learning. Teaching strategies are suggested in this section and also in the *Using the Page* section. The student's pages are designed to complete instruction initiated in the preliminary activities, and to assess student learning.

During the learning stage, children will be working with concrete materials and then be brought to the appropriate student's page when ready. The work completed on the student's page will provide a summary of the extent of the learning and indicate a need for reinforcement with extra material.

Reinforcement and enrichment activities are suggested in the *Related Activities* as extensions of the lesson or applications in the form of games.

Grouping for Instruction

Knowing what to teach is one thing, but knowing how to adapt a program for individual differences in ability and capacity for achievement is the ongoing role of all teachers.

It is possible to work with lower achievers and higher achievers by using the same material but by altering the teaching procedure. Lower achievers, as in other subjects, need a slower pace to provide for maximum use of concrete materials and pictorial representations as well as varied activities to ensure understanding.

With higher achievers you will often wish to move at a faster pace. This does not mean a more rapid movement through the lessons, but rather a change in approach. All children need the benefits derived from the use of concrete materials for both present and future understanding, but higher achievers tend to move more readily from the concrete to the abstract levels of mathematical thinking. They grasp concepts and skills quickly and will benefit from exploration and challenges that will allow them to use and broaden their newly acquired abilities in different situations, as in assisting other members of the class.

Grouping for instruction is dependent on a number of factors, including teacher preference, teaching strategy, social and academic needs of children, abilities and skills of the children, the need to vary instruction, the organization of the classroom. Some possible ways for grouping are given below.

The Whole Class

Instruction of the whole class is appropriate for the introduction of new topics or class projects.

Skill Groups

For this grouping the teacher selects children having similar needs for the teaching of a specific skill. When the skill is mastered, the group is dissolved.

Interest Groups

For this grouping the child chooses to be a member of the group based on interest in the activity being offered. For example, while one concept is being explored by the whole class, a child may have the choice of working at the sand table or with geoboards. Interest groups may be formed for the study of a theme or for a group project. This kind of grouping promotes sharing among the children and offers opportunities for children to display leadership.

Random Groups

This type of grouping may be as arbitrary as the grouping of all children wearing something red or as open as to include pairs of friends. It is especially suited to situations involving games, experiments, and making things, for example, models of three-dimensional shapes.

Often children may be part of a group, but they may work independently within the group. It is here that the teacher can observe and plan for individual needs. By moving from group to group the teacher can evaluate and assess performance as well as direct and guide learning. Working with a variety of groupings and with individuals within the groups establishes a balance between teaching effectively and satisfying individual needs.

Providing for Individual Differences

Suggested strategies for motivating, teaching, providing practice, and presenting applications are built into the program. Other strategies may need to be considered for children in a particular class.

The approach to teaching a lesson may be that of teacher direction only or student discovery only, or it may be a combination of the two. These alternatives will accommodate student differences and differences in mathematics topics. Measurement and geometry, for example, provide opportunities for student-discovery lessons. Although some children appreciate opportunities for making discoveries, other children derive greater benefit from interaction with the teacher during the learning process.

Problem Solving

The problem-solving strand is integrated and interspersed throughout *Starting Points in Mathematics 1*. Problem situations are introduced informally through activities suggested with concrete materials. In this way, problems involve objects and experiences related to the children's environment. Situations may involve joining or separating actions, or simply a comparison of two groups. Later, problem situations that are presented pictorially invite oral interpretation and discussion. More formally, word problems are presented along with pictures to minimize the reading skills required. Such problems involve the application of previously learned skills such as addition and subtraction.

The development of the problem-solving strand includes skills and strategies listed below. The material in this strand, however, is by no means exhaustive. Teachers will capture the right moments in their daily contact with the children to provide the insights and skills to develop better problem-solving techniques.

- interpreting action situations as joining or separating
- illustrating word problems
- writing / completing number sentences
- drawing pictures to illustrate number sentences
- choosing the correct operation
- reading / interpreting graphs
- solving problems related to money, measurement, and geometry

Testing and Evaluation

Formal written tests are unreliable as a means of measuring achievement of young children, because a written test does not indicate the method or process used to obtain the answer to a problem. Oral questioning and observation, particularly in the manipulation of concrete objects, are required to determine the skills and concepts that have been mastered and those that have presented difficulties. This questioning and observation can be a continuous process as the children are engaged in discussion, games, and the many activities suggested for teaching the various concepts and skills. For teachers who also wish to include a more formal method of testing, there is a *Checkup* at the end of each unit consisting of topics such as number concepts and operations that can be tested by the paper-and-pencil-response technique. But here also, a teacher may prefer to give oral instructions and have the children respond orally or demonstrate a physical action of manipulating objects.

If a child is having difficulty with a number or measurement concept, you may wish to determine her/his level of thinking by using one or more of the tests for conservation on pages xvi and xvii.

If evaluation is to be an ongoing process, it is important to keep complete and accurate records of the achievement of each child. A file containing remarks on progress based on the observation of the teacher and samples of the child's work is recommended. The remarks can be dated and are an excellent reference when reporting to parents. The samples of work can be selected by both the teacher and the child. If children play an active part in contributing work that indicates their mastery of a concept, they also recognize that learning is important. This is an essential factor in assuring future success.

The comprehensive evaluation chart on pages T349 and T350 is intended for use at the end of the school year, but it may be adapted for other uses. For example, if the indicated program is too ambitious for all the children in a class, the chart may be used as a guide for obtaining a minimum program or an average program for the children. The format of the chart may also be adapted as a report to show parents the progress their children have made.

You may wish to adopt a code for recording the stages of development in each child's mastery of concepts and skills. Slashes and dots may be used in such a way that a box marked ☐ means that the child has been introduced to the concept or skill; a box marked ☒ means that the child understands the concept or skill; a box marked ☒ means that the child has mastered the concept or skill. Examples are shown.

Measures in metres

Identifies additive situations

Writes numerals to 99

☐ (Exposure)

☒ (Understanding)

☒ (Mastery)

A Thematic Approach to Mathematics

In the development of the primary phase of the program for *Starting Points in Mathematics*, each unit has been considered from a thematic aspect. The considerations given to this aspect of curriculum planning did not alter the mathematics, but did provide many opportunities to enhance the teaching strategies.

Teachers who attempt to provide an integrated curriculum frequently encounter difficulty interweaving the mathematics curriculum with other subjects and in creating sufficient real-life situations to make the association a meaningful one. The thematic organization offered in *Starting Points in Mathematics* is provided to assist those teachers who wish to organize their teaching in this manner. The themes in each book have been selected

- to appeal to a wide range of children's interests;
- to provide suitable topics for integrating the curriculum;
- to suggest real-life situations that provide a framework for mathematical understanding.

Teachers who have never tried integrating mathematics may wish to experiment with one or more of the themes suggested. They may be surprised that there are practical aspects in using a thematic approach. For example, time can often be used more efficiently by integrating several subject areas. This approach also facilitates the planning of activities when working within the framework of a topic. Resources and materials required may serve several purposes; for example, art materials may be used as a method for communicating mathematical concepts.

The themes are prevalent in the visual material shown in each unit. Where possible, the concrete materials used in the teaching of a concept are chosen to fit the theme; but certain topics, such as measurement and geometry, did not always lend themselves to a particular theme. In addition to this visual link, the introductory material for each unit offers suggestions on how to integrate the theme of that unit with the following subject areas:

Language	Art
Mathematics	Movement
Science	Music
Social Studies	

Representative activities are given for each subject area. These may suggest ideas for other activities that will appeal to the children. The children may also make suggestions for activities they wish to explore. Involving the children in planning the activities within a theme is a valuable learning experience for them, and enables the teacher to observe and assess each child's development.

The themes for *Starting Points in Mathematics 1* are

Unit	Theme	Unit	Theme
1	Colors	7	At School
2	Me	8	In the Country
3	Odds and Ends	9	In the City
4	Animals	10	In Space
5	Foods	11	At the Fair
6	The Sea	12	People and Work

Testing for Conservation

Conservation can be thought of as the property of remaining unchanged in different situations. For example, the length of a pencil remains the same whether it is positioned horizontally, vertically, or obliquely. Although this concept is obvious to adults it is another matter altogether for young children. To a young child, the simple act of pouring an amount of liquid from a short, wide container into a tall, narrow container intuitively seems to increase the volume of liquid. Thus, young children are not like adults in their thinking, in that they rely heavily on perception.

It must be kept in mind that one cannot “teach conservation” to children. An understanding of the concept of conservation comes at a particular stage in a child’s mathematical development. For teachers of young children, it is important to know at what level a child is thinking, in order to be able to provide experiences that will assist the child in moving away from intuitive thinking and toward operational thinking, which involves a greater degree of mental activity.

In considering how to determine a child’s level of thinking, we may refer to the work of Jean Piaget. In his extensive research into how children think, Piaget devised a number of tasks for children. These are carried out on an individual basis with each child and the child’s responses to certain questions reveal how he/she sees objects and situations. Several tasks are described here, but it must be pointed out that since the objective is to determine how the child observes certain situations, there must be no attempt to sway the child’s thinking while he/she answers the questions.

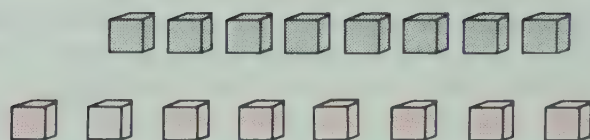
Number: By the time most children begin school at four or five years of age, they are able to recite the sequence of counting numbers from 1 to 10. However, the ability to rote count can be misleading because it suggests an understanding of numbers. It has been said that reciting number names in order has about the same relation to mathematics that reciting the alphabet has to reading. Although children may be able to recite the number names in order, they may have difficulty assigning them correctly to sets of objects. Frequently, in counting objects, they will count an object more than once or perhaps skip it altogether. Thus, a child may not recognize that counting objects involves ordering them as well.

Once a child can count the objects in a set without difficulty, it is important to find out whether he/she understands the concept of conservation of number. That is, that the number of objects remains the same regardless of the spatial arrangement.

Place eight red blocks and eight blue blocks on a table. Ask the child to match the red blocks and the blue blocks one to one. Ask if there is a red block for each blue block. Then ask if there are as many blue blocks as red blocks.



As the child watches, spread the set of blue blocks apart. Ask again whether there are as many blue blocks as red blocks or whether there are more blue blocks than red blocks.



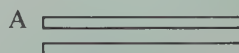
If the child answers that there are still as many blue blocks as red blocks, ask the child how he/she can tell. You may repeat the test using a greater number of blocks of each color, say, 10 or 12, to see whether that child can conserve number at this new level. If, however, the child replies that there are more blue blocks when they are spread apart, do not pursue the matter or attempt to have the child alter her/his answer. It would be preferable to return to the problem after the child has had more experiences with counting activities similar to those described below.

- This activity may be carried out with a small group of children, say, five. Have the children sit in a circle and have each child hold an object such as a block or a bead. Designate one child as being first. Each child in turn places her/his block in a box in the centre of the ring as the children count aloud. When all the blocks have been placed in the box, ask the children to predict how many blocks there will be in the box when it is emptied for counting. Take the time to have each child whisper her/his answer in your ear before you empty the box and count together. Then repeat the procedure, choosing a different child to be first.

- Ask the child to count five beads into a box. Place a cover on the box and shake the box. Remove the cover and ask the child how many beads there are now in the box. A child who understands conservation will reply “five” immediately and wonder why you have asked for such an obvious answer. A child who counts the beads again before saying “five” should repeat this kind of activity at different times until he/she appears to show an understanding of five. You may prefer to begin this activity with fewer than five beads.

- Have the child count five beads into your hand. Shake them first and then place some in one hand and the rest in the other hand. Have the child tell you how many beads there are all together. Observe whether the child must count the beads again before saying “five”. Repeat the procedure several times with different numbers of beads.

Length: Young children see length in terms of end points rather than as a property that an object possesses. That is, if the end points of two objects are aligned, they would be considered as having the same length. This concept is correct for the two sticks (A) but incorrect for the stick and the string (B). Also, when two objects are positioned so that their end points are not aligned (C), children may consider them as having different lengths.



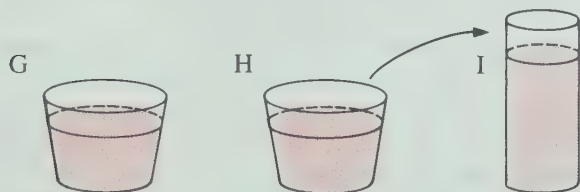


Select two sticks (pencils, strips of paper) of equal length and ask the child to show that they have the same length. This will likely be done by placing them together and observing that their end points are aligned (A). As the child watches, move the first stick to a new position (C, D, E, or F). Ask questions to determine whether the child thinks that one stick is longer than the other or that the two sticks have the same length. Return the stick to its original position (A) and repeat the questions.

If the child demonstrates that he / she can conserve length for this first situation, you may continue the test by moving the sticks in different directions, or by repeating the test for two pieces of string having the same length. However, if the child sees the relationship between the lengths as a changing one, it would be best to delay further comparisons until a later time.

Quantity: Since children rely on perception in their thinking, it is no wonder that they associate the volume of a liquid with the shape of the container. Present a child with two equal quantities of juice, one in a short, wide container, the other in a tall, narrow container; and the child will invariably select the tall, narrow container because it appears to hold more juice.

Place two identical glass containers (G, H) on a table and assign the child the task of pouring the same amount of liquid from a jug into each container. This can be a time-consuming task since many children make a painstaking attempt to be accurate, but the procedure is an important one in terms of the rest of the test.

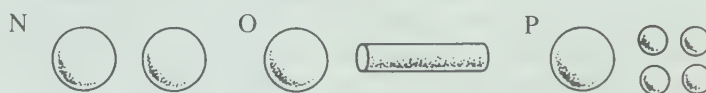


When the child is satisfied that the two containers have the same amount of liquid, carefully pour the contents from one container (H) into a tall, narrow container (I). Ask questions to determine whether the child thinks that of the two containers (G and I) one container holds more liquid than the other or the same amount of liquid. Carefully pour the liquid back into the second container (H) and repeat the questions. Children who do not yet understand conservation of volume will see the liquid as changing to "more than" in the taller container and returning to "the same as" in the shorter container.

Mass: To a young child, changing the shape of an object results in a change in mass. For example, Plasticine molded in the shape of a sphere (J) will appear to change in mass if it is rolled into the shape of a cylinder (K), a ring (L), or squashed to a shapeless lump (M); and will appear to contain more Plasticine than the original shape.



Have the child use the balance scales and Plasticine to make two balls of equal mass (N) and then remove them from the scales. Ask whether there is more Plasticine in one ball than in the other or whether there is the same amount of Plasticine in the two balls. The child will likely say that they have the same amount since they have just been made that way. Have the child change the shape of one ball by rolling it into a cylindrical shape (O). Ask whether there is the same amount of Plasticine in the cylinder as in the ball or whether one has more Plasticine than the other. Ask the child to give a reason for her/his answer. Finally, have the child roll the cylindrical shape into a ball again and repeat the question. Depending on the answers given, the test may be extended so that one of the balls is changed in a variety of ways, including dividing it to make two or more smaller balls (P).



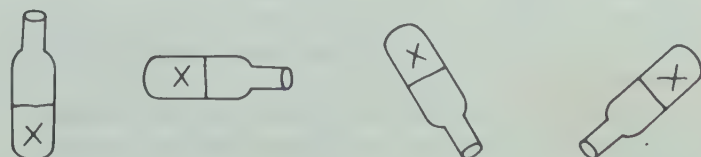
The two balls of equal mass (N) may be used for a test for conservation of displacement of volume.

Present a child with two equal quantities of water in identical transparent containers (Q) and the two Plasticine balls of equal mass. Ask the child to place one ball in each container. Note that the water rises to the same level in each container (R). Remove the ball from one container and have the child roll the Plasticine ball into a cylindrical shape as before (O). Ask whether the water will rise to the same level as the water in container S when the cylindrical shape is placed in container T.



Horizontal Position: Although this concept is not one of conservation, it is nevertheless an interesting one and can provide an insight into the child's level of thinking. Consider the question, "How does the liquid in a bottle behave as the position of the bottle is changed?"

In his work with children, Piaget had them consider this problem in the following way. A child was shown a bottle partially filled with liquid on a level surface and then the bottle was concealed in a bag. The bottle was held in a different position and, on a drawing representing the bottle, the child was asked to draw a line to show where the water came to and to mark an X to indicate the water. In view of some of the typical responses shown below, it is no wonder that so many spills occur when young children are holding containers of liquid.



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Scope and Sequence

Grade 1

NUMBER AND NUMERATION

Read, write numerals from 0 to 99
Place value for two-digit numbers
Count, order, compare numbers to 99
Ordinal number concepts to *ninth*

ADDITION

Basic facts, sums to 10 (11, 12 optional)
Order of addends; grouping of addends
Related addition, subtraction facts
Algorithm with two and three addends,
sums to 10 (to 12 optional)
Write addition sentences

SUBTRACTION

Basic facts, minuends to 10
(11, 12 optional)
Related subtraction, addition facts
Algorithm, minuends to 10
(11, 12 optional)
Write subtraction sentences

MULTIPLICATION

Count by 2's; by 5's; by 10's
Readiness for facts of 2

DIVISION

Separate into two equal groups

DECIMALS AND FRACTIONS

One-half, one-fourth of a whole
One-half of a set

Grade 2

Read, write numerals from 0 to 999
Place value for three-digit numbers,
regrouping between tens and ones
Order, compare numbers to 999
Ordinal number concepts to *tenth*

Basic facts, sums to 18
Families of related basic facts
Algorithm with regrouping, sums to 99
Algorithm, sums to 999
regrouping ones (optional)
Add amounts of money, sums to 99¢
Add to check subtraction

Basic facts, minuends to 18
Families of related basic facts
Algorithm with regrouping,
minuends to 99
Algorithm, minuends to 999
regrouping tens (optional)
Subtract amounts of money,
minuends to 99¢

Facts of 2, 5, 10
Write multiplication sentences

Group to show halves, thirds, fourths,
tenths
Group by 2's, 5's, and 10's

Halves, thirds, fourths, tenths of a whole
One-third, one-fourth of a set

Grade 3

Read, write numerals from 0 to 9999
Place value for four-digit numbers,
regrouping among the places
Compare, order numbers to 9999
Expanded form
Ordinal number concepts to *thirty-first*

Algorithm, three-digit addends,
four-digit sums
Algorithm with three addends
Add amounts of money,
sums less than \$50.00
Add decimal tenths

Algorithm, four-digit minuends,
three-digit differences
Check by addition
Subtract amounts of money,
minuends less than \$50.00
Subtract decimal tenths

Basic facts
Write multiplication sentences
Order of factors
Related multiplication, division facts
Algorithm, two-digit multiplicand,
one-digit multiplier

Basic facts
Write division sentences
Related division, multiplication facts
Introduction to algorithm, remainders

Mixed form with halves, thirds,
fourths, tenths for wholes
and parts of wholes
Halves, thirds, fourths,
tenths of a set
Decimal tenths and hundredths
of a whole
Place value for decimal tenths
Compare, order decimal tenths
Add, subtract decimal tenths

Grade 1

Grade 2

Grade 3

PROBLEM SOLVING

Draw pictures
Complete and write number sentences for picture and word situations
Choose the operation needed, addition or subtraction
One-step computations, addition or subtraction

Manipulate sets of objects
Complete the concluding statement incorporating the answer
One-step and two-step computations: addition and / or subtraction

Draw pictures and diagrams
Multiple-step solutions: addition, subtraction, comparison
Write concluding statements
Identify relevant, irrelevant, missing information
Guess and test
Multiple solutions
Recognize answers as reasonable

MEASUREMENT

Comparisons
Money: penny, nickel, dime, quarter: value of dimes to 90¢, coins to 50¢
Time: parts of day, hour, half-hour, days of week, calendar for current month
Non-standard units of length, capacity, mass, and area
Use the metre stick

Money: amounts to \$1.99
Time: quarter hour, five-minute marks, intervals of one minute, calendar
Read, record temperature
The metre, decimetre, centimetre; the litre; the kilogram
Estimate length, mass, capacity
Count for area and volume
The distance around a shape

Read, record time to the nearest minute
Use a calendar to identify dates
Measure in centimetres, decimetres, to the nearest unit
Estimate and measure in centimetres, decimetres, metres
Convert between decimetres and centimetres; centimetres and metres
Express metres, decimetres, and centimetres with decimals
Estimate and measure capacity in litres
Estimate and measure mass in kilograms
Introduction to kilometres, grams, and millilitres
Measure and compare temperatures
Find perimeter by measuring
Count centimetre squares; give area in square centimetres
Count centimetre cubes; give volume in cubic centimetres

GEOMETRY

Classify, sort according to common characteristics
Identify triangles, squares, circles, rectangles
Copy and make shapes
Copy and continue patterns; make designs
Recognize three-dimensional shapes
Recognize and show line symmetry

Match identical shapes
Know properties of two-dimensional and three-dimensional shapes
Identify shapes having line symmetry
Slide, turn, and flip shapes

Recognize similar shapes
Recognize, draw, compare line segments
Identify and name triangles, rectangles, squares, pentagons, hexagons, octagons
Recognize cubes, prisms, pyramids, cones, cylinders, spheres
Count faces, edges, vertices
Create slide, flip, or turn images
Create patterns using slides
Identify and show lines of symmetry; create shapes having line symmetry

GRAPHING

Complete and interpret bar graphs

Complete and draw bar graphs
Interpret pictographs

Gather and organize information in bar graphs
Create and interpret pictographs
Associate ordered pairs of numbers and points on a grid
Complete line graphs

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PRACTICE IN ADDITION AND SUBTRACTION

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The numbers 30 to 39	185
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Timing Schedule by Units

The following information will guide you in planning your schedule for working through *Starting Points in Mathematics I* in one year. Depending on the abilities of the children in your class, you will find sufficient material in Book 1 for a minimum program, an average program, and an enriched program.

There are approximately 175 days in the school year. The number of pages in Book 1 is 250. The number of days required to complete a unit will depend on the level of the children in your class. If the topics in Units 11 and 12 are considered optional, more days will be available for further

practice and evaluation related to the topics of Units 1 to 10. Also, if the pre-number concepts in Unit 1 are not needed by the children in your class, you may begin the year's work with Unit 2.

No suggestions have been made for maintenance lessons because the need for these can be determined only by you for the children in your particular class.

Teachers wishing to provide a minimum program may plan to omit pages of certain units and, depending on the children's progress, return to some of these later in the year. In planning any schedule, it should also be kept in mind that certain topics such as measurement and geometry require more time than others as they involve more activity with concrete objects and manipulative materials.

Unit	Number of Pages	Number of Days	My Schedule
1	16	7-12	
2	22	14-18	
3	26	17-20	
4	20	14-17	
5	22	15-19	
6	20	12-16	
7	22	12-17	
8	22	12-17	
9	24	15-20	
10	22	14-18	
11	20	10-14	
12	10	6- 9	
Year-end checkup	4	2- 3	
Total	250	150-200	

Timing Schedule by Strands

If you are a teacher who prefers to use a-strand organization of the 250 pages in Book 1, the following information will guide you in planning your schedule for working through *Starting Points in Mathematics 1* in one year. The sequence, of course, is flexible; for example, you may wish to deal with all the geometry concepts at one time, rather than at the two different times suggested below.

There are approximately 175 days in the school year. The number of days required to complete a strand will depend on the level of the children in your class. If certain topics, such as amounts of money greater than 25 cents, area, and basic addition and subtraction facts for 11 and 12, are considered optional, more days will be available for further practice and evaluation related to addition and subtraction, numeration, measurement, and geometry. Also, if the pre-number concepts

are not needed by the children in your class, the year's work may begin with numeration involving the numbers to nine. Depending on the abilities of the children in your class, there is sufficient material in Book 1 for a minimum program, an average program, and an enriched program.

Note that each *Checkup* is not included in the outline. Exercises from these pages may be assigned where appropriate, or the pages may be used as review prior to the *Year-End Checkup*. No suggestions have been made for maintenance lessons because the need for these can be determined only by you for the children in your particular class.

Teachers wishing to provide a minimum program may plan to omit pages of certain units and, depending on the children's progress, return to some of these later in the year. In planning any schedule, it should also be kept in mind that certain topics such as measurement and geometry require more time than others as they involve more activity with concrete and manipulative materials.

Strand	Number of Pages	Number of Days	My Schedule
Pre-number concepts	12	5- 8	
Numeration, to 9	45	26-33	
Addition, sums to 9	19	13-17	
Subtraction, minuends to 9	15	10-13	
Practice in addition and subtraction	7	3- 5	
Addition and subtraction, sums and minuends to 10	17	13-16	
Graphing	3	1- 2	
Sets of tens	2	1- 2	
Numeration, to 19	5	3- 4	
Money	7	4- 7	
Practice in addition and subtraction	5	2- 3	
Geometry	13	8-10	
Relating basic addition and subtraction facts	8	4- 6	
Practice in addition and subtraction	5	2- 3	
Fractions	9	5- 8	
Numeration, to 100	20	15-17	
Measurement			
Time	7	5- 6	
Length	6	5- 6	
Mass	3	2- 3	
Capacity	2	2	
Area	2	2	
Geometry	4	2- 3	
Addition and subtraction, sums and minuends to 12	11	6- 8	
Money	7	3- 5	
Checkup	12	6- 8	
Year-end checkup	4	2- 3	
Total	250	150-200	

The Mathematics Centre

A mathematics centre, like centres for other subject areas, is a place for the storage of certain specific materials and an area for the children to become involved in activities. With careful planning and involvement of the children, the mathematics centre can become a stimulating environment. The children will enjoy bringing materials from home to supplement and add variety to those in the centre. The mathematics centre is an ideal place to display the children's work. If a thematic approach is used for teaching mathematics, the centre can be adapted as a setting for each new theme.

When the children have finished their regular assignments, they may engage in extra activities and projects in the mathematics centre. Activity cards, puzzles, games, and homemade as well as commercial materials will lead the children to broader understanding as well as provide opportunities for the teacher to observe and question the children, and to evaluate their progress. Consideration of the children's interaction in the mathematics centre will suggest adaptations to make this strategy an important part of the learning experience.

STORAGE OF MATERIALS

Materials should be stored where children can have easy access to them. Open shelves and small tables can be used in a pleasing and practical arrangement for holding containers. Containers for materials should be both sturdy and colorful. Vinyl coverings, spray enamel, wallpaper, and fabric will increase the durability of the containers as well as the appeal of the mathematics centre. The following are some ideas for containers to add variety to the centre.

Pails: Cut the top off a large plastic bottle. Punch two holes in the remaining part and insert a wire handle. Decorate the pail with vinyl adhesive shapes.

Trays: Collect the corrugated boxes in which canned soft drinks are sold. Cover each box with pre-pasted wallpaper.

Baskets: Select a variety of cardboard or wooden baskets, with handles, in which fruit and vegetables are sold. Spray each basket with brightly colored paint.

Boxes: Collect sturdy boxes made of corrugated cardboard, such as those from small appliances. Openings may be cut at the top of opposite ends for easy carrying, but these "handles" should be reinforced with vinyl tape. Cover these boxes with fabric or wallpaper.

Other Containers: Ice cream containers, large cans, plastic tubs, and foil containers can also be decorated and used for storing materials.

MATERIALS

The materials used for teaching mathematics need not be expensive commercial materials; simple everyday objects can be used effectively as learning and teaching aids.

A list of the materials suggested for each unit is given in the unit overview. When a unit is almost completed, look ahead to the next unit and begin to collect and have the children help to collect the materials.

The following materials will be helpful for developing the various concepts and skills.

Pre-Number Concepts

Collections of objects from which to choose items

- for identifying likenesses and differences
- for sorting activities
- for one-to-one matching
- for making size comparisons
- for forming patterns

Suitable objects for these collections include

balloons	crayons	pasta pieces
balls	cutouts of pictures	pebbles
beads	cutouts of shapes	playing cards
beans	geometric shapes	shells
blocks	gummed shapes	spools
bottle caps	marbles	tongue depressors
buttons	nesting toys	toothpicks
clothes pins	nuts	toy cars

Suitable containers for sorting these objects into sets are

egg cartons	muffin tins
plastic tubs	plastic hoops
paper or foil plates	Styrofoam trays

Number

- counters such as beads, beans, buttons, pebbles, spools
- Unifix cubes
- objects for grouping, such as tongue depressors, popsicle sticks, pipe cleaners, drinking straws, stirrers, toothpicks, beans in plastic bags
- flash cards for the numerals 0 to 10 and the words *zero* to *ten*
- flash cards for addition and subtraction facts
- index cards for making number concept cards
- number trays for the numbers from 1 to 10 (11 to 20 optional)
- dice or condition cards for games (See page T23.)
- dominoes and domino cards
- shapes marked to show halves and fourths of a whole

Geometry

- a collection of three-dimensional shapes, such as balls, boxes, cans, tubes from rolls of paper, funnels
- commercial wooden or plastic solids (cubes, cones, spheres, cylinders, rectangular prisms, triangular prisms, triangular pyramids, square pyramids)
- commercial wooden or plastic plane shapes (circles, rectangles, squares, triangles, hexagons (optional))
- geoboards, colored rubber bands
- geopaper (See pages T333 and T334.)
- parquetry blocks and gummed shapes for forming patterns
- pictures of symmetrical objects and shapes
- felt, plastic, or cardboard tangram pieces (See page T347.)

Measurement

- real money, play money, coin cutouts from page T337
- items and price tags for a play store
- non-standard units for measuring length (tongue depressors, drinking straws, cardboard strips, ribbons, paper clips, nails)
- unmarked metre sticks
- rulers or straightedges
- objects for comparing masses (stones, Plasticine balls, marbles, washers, nuts, beans, corks, small sponges, Styrofoam balls)
- balance scales

- non-standard units for measuring capacity (baby-food jars, paper cups, small cans)
- containers for comparing capacity (jars, bottles, cans, boxes)
- materials for filling containers (peas, beans, rice, shells, sand, water)
- demonstration clock, alarm clock, old mechanical clocks and wristwatches, clock faces (See pages T339 and T340.)
- sample calendars and blank calendars

It is desirable for each child to have a box of materials for her/his own use. These materials should be used during the discussion period of a lesson, but they may also be useful to the children when they are completing written work. Four basic materials are suggested below.

1. a set of counters
2. number concept cards for 0 to 10
3. a number line from 0 to 10
4. a paper-plate clock face (See page T216.)

Other materials may be included as desired, for example, a straightedge, number strips, and coin cutouts.

There are many other teaching aids that will be useful in a mathematics program, for example, Cuisenaire rods, D-Stix, Base Ten Blocks. They may be acquired over a number of years, but the following aids are basic for the activities suggested in this book.

Display Board: The display board mentioned in the suggested activities for various lessons may be a flannel board, a magnetic board, a bulletin board, and so on. Felt-backed cutouts of objects, numerals, and symbols are useful for demonstrating new concepts and illustrating additive and subtractive situations.

Display Panel: This is a board on which each child is assigned a place where a sample of her/his work is always on display. The children should be allowed to help select the sheets from their own work for display, and in this way learn to compete not with others but with themselves. They develop confidence and self-respect, learn to become more analytic toward their work, and learn to give and accept criticism.

Attribute Blocks: These are sets of wooden or plastic blocks that show likenesses and differences in color, shape, size, and thickness. One set usually includes 48 pieces made up of four shapes (circle, rectangle, square, triangle), three colors (red, blue, yellow), two sizes, and two thicknesses. (Some sets also include the hexagon.)

If commercial attribute blocks are not available, you may wish to make your own blocks by using the patterns given on pages T327 and T328. The blocks may be made from plywood of two thicknesses, one of which is about three times as thick as the other. Parents, teacher assistants, or older children in industrial arts courses may assist in making the sets of blocks.

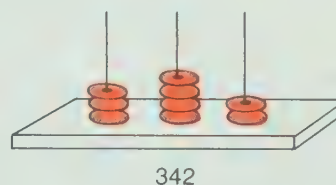
Numeral Cards: These cards are necessary for games and other activities. The first sets of cards should show the numerals from 0 to 10. Later, cards showing multiples of ten and the numerals to 99 will be required.

Number Concept Cards: These cards are described on page T31 and subsequent pages for teaching numbers to ten. If each child has her/his own set of cards, they can be used not only for activities involving numbers but also in giving responses to questions.

Number Line: A walk-on number strip made from tiles or plastic is suggested for initial experiences before introducing the number line. A number line on the chalkboard or display board may be permanently displayed where children can see it from their desks.

Peg Abacus: A simple peg abacus can be made from a Styrofoam tray, three wires of equal length cut from coat hangers, and plaster of Paris. Fill the tray with a mixture of plaster of Paris. Before it sets, insert the three wires and then allow the plaster to set. Use objects (colored wooden beads, washers, or empty spools) for representing numbers. The wires should be about 5 cm long unless empty spools are to be used, in which case they should be about 30 cm long.

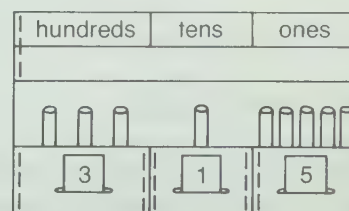
A sturdier peg abacus may be made using wooden dowels on a wooden base. It is important that children view the abacus from the same side and not from opposite sides, which would result in a reversal of the place values.



Pocket Chart: A pocket chart for demonstrating place value and regrouping may be made in a variety of ways. One of the simplest forms is illustrated below.

Bristol board or thick plastic is cut in one piece, folded, and stitched or stapled where indicated to make three pockets for working with hundreds, tens, and ones. Slits may be made in the pockets to accommodate numeral cards for showing the standard numeral for the number of hundreds, tens, and ones.

This chart may be fastened to the display board or other convenient location.



Elevator Beads: This is a convenient device for children to use for counting and for illustrating basic number facts, because the beads can be moved along the string to stay in certain positions.



Select 5 beads of one color and 5 of another color. Cut a piece of string more than twice the length of the 10 beads, being certain to provide plenty of slack. Fold the string in half and at the folded end tie a knot for a finger loop. Thread the two ends of the string through each bead with each of the two strands going through the hole from opposite sides. Continue to place the beads on the string, alternating the colors, until the 10 beads have been used. Leave some slack at the end and tie two knots for a finger loop.

Number Board: A board with 121 removable tags is described on page T325.

Unit 1 Overview

This unit includes lessons dealing with pre-number concepts, relative sizes of various objects, and simple geometric shapes. Sets of real objects and sets illustrated on the pages are used to determine which members belong to a particular set and which do not. Objects are used to create patterns, to establish one-to-one correspondence, and to form equivalent sets. One-to-one matching of objects also makes it possible to determine which of two sets has more or fewer members. Objects are compared with respect to size to determine which one is the largest or the smallest and which ones are of the same size. Two-dimensional and three-dimensional shapes are examined to discover some of their characteristics and how the shapes are alike or different. The last lesson in the unit is a *Checkup* of the concepts and skills in the preceding lessons.

Unit Outcomes

Pre-Number Concepts

- sort and classify objects according to given rules
- recognize, copy, and continue patterns
- show one-to-one correspondence
- form sets equivalent to given sets
- compare sets by one-to-one matching

Measurement

- compare and describe objects according to size

Geometry

- recognize characteristics of two-dimensional and three-dimensional shapes
- reproduce shapes

Background

Pre-Number Concepts: Exercises presented on the pages of Unit 1 are representative of the experiences necessary for developing pre-number concepts and skills upon which more formal work may be based. The activities suggested in *Before Using the Page* and in *Related Activities* help to round out these experiences.

Although the concepts and skills of this unit do not require the use of number, they are basic and can be neither assumed nor ignored if a meaningful and successful program is to be carried out.

Since number is one of the properties of a set, the two concepts occur together naturally. Frequently, when a teacher introduces numerical ideas, sets can be used incidentally and correctly without any formal definition. Throughout this book the word “set” is used in its familiar, everyday sense. The words “collection” and “group” are equally suitable and may be used interchangeably with “set”.

Members of a set are recognized as having one or more properties in common, making it possible to tell whether objects belong to the set. Such a property may be something obvious, such as color, shape, or size. On the other hand, a child may sort objects into two sets simply because “I like these but I don’t like those.”

Set	Property
A	objects that are red
B	objects in our classroom
C	objects found in Mike’s pocket
These belong	
Set A:	red ball, red book, red pencil
Set B:	pencil, chalkboard, ruler, desk, chair
Set C:	penny, hockey card, pencil, gum
These do not belong	
Set A:	yellow ball, green sweater
Set B:	lion, bathtub, bicycle
Set C:	shoe, lunch box, chair

It is important that children be provided with a variety of opportunities to sort and classify objects in other subject areas as well as in mathematics. Some sorting activities are suggested on page T6.

Because order and sequence are basic to the set of counting numbers, activities that involve copying and continuing patterns are suggested to help develop and reinforce order and sequence concepts.

The concepts *more than* and *fewer than* are introduced informally without requiring the children to count. This is achieved by using the technique of *one-to-one matching* of the members of two sets. If all the members of two sets cannot be matched one to one, one of the sets must contain more (fewer) than the other. The children first learn to match related objects, such as dogs and bones, squirrels and trees, rabbits and carrots, or cups and saucers. After the concept of matching is understood, sets of unrelated objects are used to demonstrate that there can still be a matching of one to one. Children who know how to count with understanding will be able to use that method to compare sets.

Measurement: Measurement concepts that need not involve number are used to support pre-number concepts. For example, order and sequence are reinforced and extended by arranging items in order of size. By comparing objects and pictures, children can become more aware of relative size. For example, a child may think of a stuffed toy animal as being a large one until a larger stuffed animal is seen, and then the original one must be considered as being small or smaller.

Children are asked to assign to various objects words such as *large*, *larger*, *largest*; *small*, *smaller*, *smallest*; and *the same size*. Additional words to express size and comparison are suggested in *Related Activities* for extending and enriching the children’s experiences.

Some children have difficulty determining which objects are of the same size because this involves finer perceptual skills than determining the largest (smallest) of several objects. For some, it is difficult to ignore the environment surrounding the objects and perception becomes distorted. Varied experiences in comparing concrete objects are suggested for helping children develop the perceptual skills needed to classify things as being of the same size.

Geometry: The children's introduction to geometry begins with a study of *two-dimensional* and *three-dimensional shapes*. By examining and manipulating concrete objects such as attribute blocks, the children can develop concepts associated with sets, sequence, and measurement, and at the same time acquire incidentally a number of geometric concepts and terms.

There are similarities and differences to be observed among the shapes. Some can roll, others can slide rather than roll, some can be stacked, some have corners and straight edges, and some resemble familiar objects frequently seen in the everyday world. Certain mathematical names (*cylinder*, *prism*, *pyramid*, *rectangle*, *sphere*) may be beyond children of this age group, but most will be able to use the terms *circle*, *cone*, *cube*, *square*, and *triangle*.

The suggested activities involving the geoboard offer an interesting approach to the study of two-dimensional shapes and provide opportunities for children not only to copy shapes but also to create shapes of their own.

Teaching Strategies

Discussion is particularly helpful during the first days of a new school year when teachers and children are getting to know one another, in many cases for the first time. The nature of the activities suggested for introducing the concepts in this unit will provide opportunities for discussion.

Throughout this unit and in subsequent units, words are shown at the top of pages in the textbook to indicate what is to be done, for example, *color*, *match*, *mark*, *draw*, *copy*. It is not expected that children read these words themselves. It is recommended, however, that to begin the work of each page, you draw attention to the words, read them to the children, discuss them, and elicit from the children what it is they are required to do. In this way, children become accustomed to beginning each page by reading and interpreting the instructions given.

Successful learning of any new concept or skill requires a background of experiences to bring meaning and significance to the new material. Children who have attended nursery school or kindergarten may have had opportunities to play with a variety of three-dimensional and two-dimensional shapes, and some children may even have had such experiences in their pre-school days. To ensure that all the children in the class have the necessary concepts, vocabulary, and skills to benefit from the activities of this unit, informal lessons entitled "Experiences with Three-Dimensional Shapes", "Experiences with Sorting", and "Experiences with Attribute Blocks" are provided on pages T6 and T7. According to the children's abilities and needs for such experiences, the teacher should plan to involve the children in some of the suggested activities before beginning to work with the pages in the book.

Since special materials are required for some activities, it will be necessary to instruct small groups of children at times when there is a limited supply of materials, such as geoboards, attribute blocks, and three-dimensional shapes. Other children could be working individually with work sheets, pages in the textbook, or different activities in the classroom.

Children are hesitant to participate in any formal instruction with new concrete materials unless they are given ample opportunity to play with them first. Play time with geoboards, attribute blocks, and three-dimensional shapes should be provided early in this unit before the materials are used to develop concepts.

If you do not have geoboards for the children to use, it is quite easy to make a set of small geoboards for your class.

Cut pieces of plywood measuring about 12 cm by 12 cm from a sheet that is about 10 mm to 15 mm thick. Place a copy of the pattern on page T332 on top of each piece of plywood, and drive finishing nails through the black dots to give an array of 25 nails.

Another way to make geoboards is to insert sticks or pegs (dowels or golf tees) into the ready-made holes of acoustic tile or peg board. Cut each piece with a five-by-five array of 25 holes to make a geoboard of a convenient size.

Clear plastic geoboards for use with the overhead projector are available. They are useful for demonstrating shapes and patterns to the whole class. The overhead projector may also be used with transparencies of dot patterns prepared from copies of pages T331 to T334. Another pattern is given on page T23 for a geoboard having twelve pegs equally spaced to represent twelve points of a circle.

Materials

scissors, paste, crayons, copies of page T326
balls, boxes, cans, models of three-dimensional shapes, copies of pages T329 and T330 (optional)
items suitable for sorting and classifying, devices to be used as set holders
attribute blocks in three colors and four shapes, or suitable substitute
flash cards for showing color names and names of shapes
box of similar objects in different sizes and some of the same size
display board and cutouts
beads and string, parquetry blocks, gummed shapes for patterns
geoboards, colored rubber bands, copies of page T331
transparent geoboard (optional)
overhead projector (optional)
jars and covers, bottles and caps, Unifix cubes and pattern-building cards
real money, play money, coin cutouts from copies of page T337
related objects and yarn or string for one-to-one matching

Vocabulary

color	square	dime
names of colors	triangle	quarter
shape	cone	alike
set	cube	different
member	cylinder	large
belongs	prism	larger
sort	pyramid	largest
rule	sphere	small
blocks	face	smaller
pattern	edge	smallest
repeats	corner	same size
copy	diamond	another
complete	geoboard	again
match	rubber band	as many as
draw	geopaper	one to one
mark	coins	same number
circle	penny	more than
rectangle	nickel	fewer than

Unit 1 Theme – Colors

The purpose of this theme is not to teach children the names of the colors, but to help them see and feel color through conversation, observation, exploration, and manipulation. It is hoped that through exposure to many aspects of color the child's life may become more interesting.

Set up a Color Centre to add an aesthetic quality to the classroom as well as to introduce the children to the subtleties of color.

Use a small, low table for display purposes. Various heights for displaying objects can be achieved by using stacks of books or small boxes covered with a piece of fabric. The drape of the fabric will soften the background with lines and curves. Display objects of various sizes, shapes, colors, textures, and functions. Include flowers or a plant to help make the Color Centre as attractive as possible.

Each day choose something from the table for discussion. Ask the children questions and encourage each child to participate. On their own, the children may wish to label the items on display. It may also be possible for the children to sort the items into various categories.

LANGUAGE ACTIVITIES

Plan discussion periods to explore some unusual aspects of color. The exchange of ideas will encourage the development of oral language and creative thinking. You may wish to read poems about colors from *Hailstones and Halibut Bones: Adventures in Color* by Mary O'Neill, published by Doubleday & Company, Inc., in 1961.

The following activities involve a minimum of preparation but provide a wide scope for imagination.

1. Hear-a-Color

Make a list of words that can be associated with sounds heard in the classroom. You may demonstrate sounds to elicit the words, or you may wish to have some of the children demonstrate sounds to be described by single words. Some possible words are *tap, crash, crunch, bang, splash, whir, pop*.

When there are about six or eight words in the list, ask the children to close their eyes and to listen as you make one of the sounds. Have children suggest the color that comes to mind when they hear the sound. Use a crayon to show the appropriate color beside the word in the list.

When a color has been associated with each of the words, look for relationships by asking questions similar to these:

“How are red sounds different from blue sounds?”

“Are yellow sounds soft sounds or loud sounds?”

“What other sounds might be thought of as purple sounds?”

2. Smell-a-Color

Soak each of six cotton balls with a different scent. Some possible scents are perfume, pine bath oil, vanilla, garlic, peppermint extract, and cod liver oil. Place each cotton ball on a chart. Cut construction paper of various colors into square shapes measuring about 3 cm by 3 cm.

Allow the children to smell each cotton ball. On the chart, have each child place a shape of the color he/she associates with the smell. When all the children have placed colors on all

the charts, discuss the results by asking questions such as:

“Did most children agree on the color of each smell?”

“Which color was chosen most often for each smell?”

“Which colors were not chosen at all?”

“Which of the smells are pleasant?”

“Which of the smells are unpleasant?”

“Did children associate favorite colors with pleasant smells?”

3. Taste-a-Color

Provide a bowl of candies that come in a variety of colors, such as Smarties or jellybeans. Have the children taste candies and then ask them questions similar to the following:

“Do all the red candies taste the same?”

“Which color tastes best?”

“Which color tastes like a sunny day?”

“Which color would you choose on a rainy day?”

“Can you tell which color other children were tasting?”

4. Book of Colors

Make a book in which a different color is assigned to each page. Have the children cut pictures of items of various colors from magazines or catalogues and paste them on the appropriate pages.

When the book is completed, have the children look at each page. Through discussion have them observe that although we use one word to designate a color, there is a range of shades within that color. For example, the color blue has a range from navy to the pale blue of the sky, yet we use the word *blue* for each shade.

In the discussion suggested above, more specific words for colors may be mentioned, for example, sky blue, robin egg blue, powder blue, royal blue. Record the more specific names for colors that the children know on the appropriate pages of the “Book of Colors”. You may wish to include other names for colors in this book as they occur during the school year.

5. Colors of Emotions

Have the children describe ways that people feel. List the words the children suggest, for example, *happy, sad, angry, lonely, worried, bored, jealous*. Discuss each emotion and have the children associate a color with it, for example, blue with sadness. Discuss also how people indicate the emotion they are feeling through facial expressions and body signals, for example, drooping mouths when sad, and clenched fists when angry.

Have the children collect pictures of people displaying the emotions listed. Have the children paste each picture on a sheet of paper having the color associated with the emotion. The sheets can be made into a book entitled “Colors of Feelings”.

6. What Would Happen If...?

To encourage the children to organize their ideas and to express their thoughts, have them imagine and then discuss each of the following:

“What would happen if the grass were red?”

“What would happen if the sky were green?”

“What would happen if flowers were only black?”

“What would happen if there were no color in the world?”

MATHEMATICS ACTIVITIES

Because the children have limited knowledge of number at this stage, the activities suggested involve only ordering, sorting, and matching.

1. Ordering Shades

Cut colored pieces about 4 cm square from pictures in magazines and mount each one on a card measuring 5 cm by 5 cm. Try to find at least six different shades for each color. (The small paint chips produced by a paint company are more satisfactory, if they are available.)

Have the children sort the cards into color families, for example, red, yellow, blue, green, and so on. Then have the children arrange the shades in each family from lightest to darkest or from darkest to lightest.

2. Sorting People

Ask the children to suggest ways of sorting the members of the class according to the clothes they are wearing. List the ways and then have the children sort according to these ways.

Ask all the children to place their shoes in a pile. Discuss ways in which the shoes can be sorted. Have the children sort the shoes by color.

Have children look at other children's eyes and suggest a way to sort the members of the class.

3. Matching Colors

From an assortment of scraps of fabric, both patterned and plain, cut out different shapes to represent items of clothing and mount each shape on a card. For each of these cards, mount a small square of the same fabric on another card.

Have the children match the color of the fabric or the pattern on the item of clothing with the corresponding square of fabric. Discuss the colors and the patterns with the children.

4. Select-a-Color

Select one color, say, red. Ask each child in turn to name some things in the classroom that can be described in the following ways:

long and red	thick and red	soft and red
short and red	heavy and red	round and red

You may wish to extend this activity by assigning each child the task of bringing from home an item that has either two or three attributes. For example, for a small blue object a child might bring a button; for a long, thin yellow object a child might bring a piece of yarn.

5. Disappearing Colors

Prepare a set of colored objects for children to play the following game. Display, for example, one block for each of the colors red, orange, yellow, and green. Tell the children to cover their eyes while you remove one of the blocks. Have them uncover their eyes and guess the color of the missing block. Ask the child who guesses the correct color to remove a block for the next round.

For a more challenging game, you may remove more than one block, increase the number of blocks, or include two blocks of the same color.

SCIENCE ACTIVITIES

Provide activities similar to the following that will give the children opportunities to explore and experiment with color, and to discover ways in which color is affected.

1. Bubble Fun

Make a solution of water and liquid detergent. Give each child a drinking straw and have the children dip one end of the straw in the solution and then blow slowly from the other end to produce bubbles.

Ask questions similar to the following:

"What colors are there in the bubbles?"

"Is it easier to make bubbles on a sunny day or on a rainy day?"

"If the solution is colored, are the colors in the bubbles affected?"

2. Fading Colors

Mount pieces of fabric of different colors measuring 20 cm by 20 cm on tag board. Have the children describe the texture and the color of each piece of fabric. Drop some of a solution of chlorine and water on each piece of fabric. To avoid damage to clothing and skin, do not let the children handle the solution. Encourage the children to describe what is happening and to predict what may happen.

Sunlight affects color. Place pieces of colored construction paper in bright sunlight and leave them for several days. Compare these pieces with others kept in a cupboard. Ask the children to describe what happened to the pieces that were exposed to sunlight.

3. Evaporating Colors

Have the children pour equal amounts of colored water (blue, yellow, red, green, black) into white or translucent plastic tubs. Place the five tubs of colored water uncovered on a window sill, preferably a sunny one. Measure the amount of water in each tub on the two following days. Does the black water evaporate more quickly than the water in the other tubs?

SOCIAL STUDIES ACTIVITIES

Color has both aesthetic and practical value in our everyday lives. By making the children aware of color, they may become more observant and be able to look more critically at their environments.

1. Color in Environments

Examine several environments, such as the classroom, the playground, a residential area, and a park. When the children are in each environment, have them discuss the colors that are found there, the colors that are predominant, and the colors that do not appear at all.

Have the children illustrate each environment through paintings, Plasticine models, or a diorama. After all the environments have been examined, compare them in terms of color by asking questions similar to the following:

"Which environment is the least colorful?"

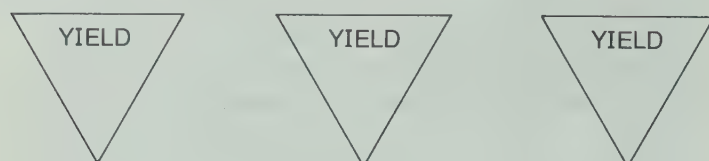
"What things in nature have unchanging colors?"

"What things in nature come in a variety of colors?"

2. Color as a Signal

Color is used universally as a signal for designating particular services. These colors are often the same from community to community, and sometimes from country to country. Although this is a difficult concept, encourage the children to think of examples such as mailboxes, fire-alarm boxes, traffic lights, fire trucks, and flashing lights on police cars. Discuss why particular colors have been chosen and why it is important that some things always be of the same color.

Have children work in small groups to make four or five life-sized traffic signs. Paint each sign with a different combination of colors. After the signs have been completed have the children judge the signs for visibility.



Red letters
Black background

Black letters
Yellow background

Blue letters
White background

ART ACTIVITIES

Encourage the children to explore and experiment with color in a variety of media. Different creative effects can be achieved by using food coloring, tempera paint, finger paint, Plasticine, colored pens and pencils, and colored paper.

1. Warm and Cool Colors

Discuss the idea of warm colors (red, orange, yellow) and cool colors (green, blue, purple) with the children.

Prepare a weak solution of each of the warm colors for use as washes. Have each child use a sponge to cover a sheet of paper completely with yellow. Then have each child cover the bottom two-thirds of the sheet with orange, and finally the bottom one-third with red. Allow the sheets to dry.

Ask the children to suggest ways in which they could use the colored sheets. (They would make colorful backgrounds for some of the pasting activities suggested in *Related Activities*.)

Repeat the activity using cool colors.

2. Color Recipes

Provide containers of fairly thick paint, short pieces of drinking straws, and pieces of paper measuring about 20 cm by 30 cm.

Have the children place drops of different colors on their papers and mix them to make new colors. They may record the recipe for a color by showing the drops required to make each new color.



Have the children choose names for some of the new colors they have created.

MOVEMENT ACTIVITIES

Young children should be aware of their bodies and the ways that they can move their head, limbs, and trunk. Discuss various ways of moving (crawling, walking, running, hopping, skipping) and the color suggested by each.

1. Hands Up – Hands Down

Choose an activity for the children to perform with their hands, such as putting their hands on top of their heads or placing them on their shoulders. Observe the clothing that the children are wearing and use conditions similar to these:

Hands up –

if you are wearing blue socks

if you are wearing a yellow shirt

if you are wearing a red sweater

Invent conditions that will include all the children in the group. Then choose other colors and ask the children to put their hands down for conditions similar to the following:

if you are wearing a green ribbon

if your blouse or shirt is white

Continue the procedure until all the hands are down.

2. Walking Colors

Place small colored objects (blue, yellow, red, green) in a bag. Have each child select at random an object from the bag. When each child has an object, give directions similar to the following:

“Yellow – walk to the door.”

“Red – run to the flag.”

“Blue – hop to the bookcase.”

“Green – skip to the chalkboard.”

Continue with other directions for each color.

MUSIC ACTIVITIES

Color can be related to music that the children make as well as to recorded music. In either case, children should be encouraged to “feel” the music and to associate with it the color that produces the same feeling.

1. Making Colorful Music

Provide materials for the children to make simple musical instruments. Shaking, plucking, and tapping kinds of “musical instruments” can be made from household discards such as boxes, plastic bottles, and cardboard tubes. When the musical instruments are ready, discuss the idea of sounds having colors. Have the children listen to the sound of each musical instrument and discuss the color suggested by the sound.

Present challenges similar to the following:

a. Have a child make music to match the color of her / his eyes.

b. Ask two children to make “red” music together.

c. Ask three children to make a “bright” song for which the first player plays red, the second player plays orange, and the third plays yellow.

d. Have the children decide which instrument makes purple sounds.

e. Have children try to make different colors of music on the same instrument.

2. Listening to Colorful Music

Have the children listen to a variety of rhythms and tempos of music. Involve the children in a discussion by asking them these questions:

“What colors do you hear in the music?”

“Does the music stay the same color or are there changes in the color?”

“Do you hear more than one color at the same time?”

“Does the music make you think of a poem?”

3. Colors in Songs

Make a book of the titles of songs that mention a color. Add to the collection as children suggest new titles. Use the following songs to start the collection.

“Rudolph the Red-Nosed Reindeer”

“Yellow Submarine”

“Green Grow the Rushes O”

“Blue Bells of Scotland”

“Baa Baa Black Sheep”



Page 1

OBJECTIVE

Discuss a situation

Materials

scissors, paste, crayons, a copy of page T326 and a sheet of paper for each child

Vocabulary

color, names of colors

RELATED ACTIVITIES

- This activity emphasizes the “getting to know you” aspect of the first days of a new school year. Use a large sheet of paper at the front of the classroom. Tell the children that you want them to help you draw a picture of yourself. They will suggest colors to match clothing you are wearing, eye glasses, shoes, hair, eyes, and so on. It is interesting to discover the things that children notice about you, the teacher. Print your name on the finished picture.

If you wear a different outfit the next day, there will be an opportunity for discussion of similarities and differences, especially of colors.

LESSON ACTIVITY

Before Using the Page

- Have the children discuss things they like to do. Encourage as many children as possible to contribute to the discussion.

Using the Page

- Discuss the activities that are taking place in the picture. Ask the children to identify colors in the picture and tell of their favorite colors. Some children may recognize the names of the colors on the white cards of the mobile.
- After the discussion about the picture, give each child a copy of page T326 and a sheet of paper. Explain to the children that they are to cut out the parts of the puppet, assemble the parts in the correct order, and then paste them on the sheet of paper. While the children work, move around the classroom and check that the parts are being assembled correctly. After the pasting is completed, have each child color the picture and add details, such as facial features, items of clothing, and background.

- Instead of having the children cut out the parts of the puppet and assemble them to make a picture, you may prefer to have each child draw a picture of herself/himself. Display these pictures and discuss as many as possible. Prepare name cards in advance and use them to identify each child's picture on display. These cards can also be used to help the children when they are printing their names.

Later, the children may use their pictures as a cover for a book entitled “About Me”. Each page could show objects and experiences related to the child. They could include such topics as “My Family”, “My Friends”, “My Pets”, “Where I Live”, “My School”, “Foods I Like to Eat”, “My Toys”, “Clothes I Like to Wear”, “What I Like to Do”. Have the children choose topics to fit their individual interests. Have the children illustrate their books with drawings, pictures cut from magazines or catalogues, or items from real life. Allow this project to continue for as long as the children maintain interest, then display the completed books.

Experiences with Three-Dimensional Shapes

OBJECTIVE

Recognize three-dimensional shapes

Materials

balls, boxes, cans, commercial models of three-dimensional shapes, copies of pages T329 and T330 (optional)

Vocabulary

shape, cube, cone, cylinder, prism, pyramid, sphere, face, edge, corner

LESSON ACTIVITY

- A child's first experiences with three-dimensional shapes should be both experimental and creative. The shapes should be of different sizes and should include the most common shapes that a child is likely to encounter in the environment, namely, shapes that suggest the cube, cone, cylinder, prism, pyramid, and sphere. The shapes can be plastic or wooden models, or they can be objects brought from home. Encourage the children to play and build with these shapes. Lead them to see relationships; for example, some shapes are of the same kind, some are of the same size, some can be stacked, some roll, and some do not roll.



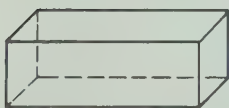
cube



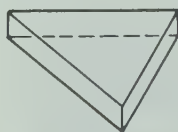
cone



cylinder



rectangular prism



triangular prism



square pyramid



triangular pyramid



sphere

- Place a set of shapes on a table. Hide an identical set from view. Place one of the hidden shapes in a bag. Have children close their eyes, feel the shape, and identify the shape on the table that appears to be the same as the one in the bag.

- Use plaster of Paris to fasten a small branch from a tree in a container. Make some of the common shapes and label each with its name. (Patterns for seven of the shapes are given on pages T329 and T330.) Have the children hang the shapes on the "tree". This "tree" can be used as a display device in subsequent lessons.

- Use shapes to form a pattern, for example, cylinder, sphere, cylinder, sphere, and so on. Have the children describe and continue the pattern.

Experiences with Sorting

OBJECTIVE

Sort objects according to given rules

Materials

objects that lend themselves to sorting activities, devices that can serve as set holders

Vocabulary

set, member, belongs, sort, rule

LESSON ACTIVITY

- Begin the sorting experiences by having the children sort themselves into two groups according to opposite properties; for example, those who are boys and those who are girls, those wearing blue and those not wearing blue. Then have one or more children sort the rest of the class according to pairs of opposite rules.

- Have a variety of objects that the children can sort according to rules you give them; for example, "Find all the red balls." Do not have the children merely sort; insist they indicate how they sorted. A discussion of each child's reason for sorting is most important.

- Try to provide sorting and classifying activities in every subject taught. The following are some sorting activities related to mathematics, science, and art:

1. Sort teacher-made cards according to those that are identical and those that are different.
2. Sort attribute blocks by color, shape, size, and / or thickness.
3. Sort three-dimensional shapes according to whether or not they roll, have edges, have corners, or have flat surfaces.
4. Sort pictures of animals according to whether the animals live on land or in the sea.
5. Sort objects according to whether or not they are attracted by a magnet.
6. Sort objects according to whether or not they float.
7. Sort pictures of things to eat into different categories.
8. Sort objects according to what they are made of.
9. Sort surfaces according to texture.
10. Sort fabrics according to the designs on them.
11. Sort a collection of nails into those that are thick and those that are thin.
12. Sort pieces of ribbon or yarn into those that are short and those that are long.

Sorting is a natural experience that occurs in the classroom. Encourage the children to return materials to their proper places when they have finished with them.

Experiences with Attribute Blocks

OBJECTIVE

Demonstrate a knowledge of properties of attribute blocks and the names of four of the shapes

Materials

attribute blocks (at least 12 pieces, one of each of the four shapes, one of each of the three colors), flash cards for colors and shapes

Vocabulary

blocks, red, blue, yellow, circle, rectangle, square, triangle

Background

Attribute blocks are described on page xxxi along with a method for preparing them from two thicknesses of plywood. If that method is impractical, you may use the following procedure to prepare several less durable, but useful, sets of shapes.

Give each child a copy of pages T327 and T328. Assign the children in your class to three groups with approximately the same number of children in each group. Ask one group to color their shapes red, another group to color their shapes yellow, and the third group to color their shapes blue. (You may wish to have the children color both sides of each shape.)

Have the children cut out the shapes and place all the shapes of the same color in one box. When shapes of two thicknesses are required, staple or paste together several identical shapes to make a "thick" shape.

LESSON ACTIVITY

- Discuss the colors of the attribute blocks with the children. Colored flash cards can be used to give the children clues for reading the words "red", "blue", and "yellow".
- Play the game "Show Me" with the children, making statements similar to the following:
"Show me something that is red."
"Show me something that is blue."
"Show me something that is yellow."
"Show me something that is not red."
- When the children recognize the colors of the attribute blocks, proceed to discuss the shapes. You may wish to use flash cards having the different shapes and showing the corresponding names.
Play the game "Show Me" again with the children, making statements similar to the following:
"Show me the shape for a triangle."
"Show me the shape for a rectangle."
"Show me the shape for a square."
"Show me the shape for a circle."

If your attribute blocks include the hexagon, you may wish to refer to it by name or call it simply "another shape". However, if children ask about its name, tell them. Other activities with attribute blocks are described on page T23.

- There are many activities that reinforce a child's understanding of the different kinds of two-dimensional shapes. From the following suggestions, choose suitable ones for the children in your class.

1. Cut sheets of paper in the shapes of circles, rectangles, squares, and triangles. These sheets can form the pages of shape booklets. For example, the children paste triangular shapes in a triangular booklet.
2. Have the children find things around the classroom that have a given shape and then draw pictures of these things on a chart.
3. Tour the neighborhood. You should plan the route beforehand and note ideas. Have the children look for things that suggest circles, rectangles, squares, and triangles. Record the examples.
4. Give the children triangular-shaped pieces of paper and have them trace around small triangular shapes to make a design. This activity can also involve square, rectangular, or circular shapes.
5. Have the children make patterns using gummed-paper shapes.
6. Have the children bring things from home that have a certain shape, for example, a rectangular stamp, a circular cover.
7. Cut out many different sizes of each of the four basic shapes from cloth or paper. Have each child make a picture by pasting several of the same shape on a sheet of paper. You may wish to have the children order their shapes from smallest to largest. Interesting details can be included by using such things as seeds, pasta pieces, and bits of ribbon.
8. Prepare a *Shape Table* divided into four sections, one for each of the four shapes. Have the children put objects into the appropriate sections.
9. Have the children cut pictures from magazines and catalogues and sort them according to the shapes suggested.
10. Have the children color pictures using codes; for example, color all the circular regions red, all the square regions blue, and all the triangular regions yellow.
11. Play the game "What Am I?" with the children. One child states a riddle telling something about a triangle or another shape and concludes by asking, "What am I?" One riddle might be "I don't have any corners. What am I?" The child who answers correctly gives the next riddle.
12. Make a set of shape dominoes. Have the children make "trains" by placing together the ends that have matching shapes.



13. Have the children close their eyes, feel a shape placed in their hands, and identify the shape.

LESSON OUTCOME

Classify objects according to given rules

Materials

objects for sorting such as attribute blocks; hoops, yarn or string for set holders; blue, yellow, and red crayons for each child

Vocabulary

alike, different

RELATED ACTIVITIES

- Have the children use templates to trace shapes. Have them cut out shapes and paste them on a chart having columns labelled "Triangles", "Circles", and "Squares" (or "Rectangles").
- Have the children cut out and paste shapes on paper to make a design using only triangular shapes, or only square shapes.
- Have the children play sorting games with packs of regular playing cards. For example, a deck may be sorted into (1) red cards and black cards, (2) suits (hearts, clubs, diamonds, spades). The sorting may be done by one child alone or it may become a game involving two or four players. The cards are dealt equally and each player sorts her / his own cards. At the start of each game, one property for sorting should be selected. At the end of the game, the player with the most cards is the winner.

Color.

2 (two)

Classifying according to shape

Color the shapes that belong in each set

LESSON ACTIVITY

Before Using the Page

• Play the game "What's My Rule?" with the children. Place two hoops on the floor or make two rings of yarn or string to be used as set holders. Using opposite rules, one for each set holder, place some objects within the set holders. For example, place a few thick shapes within one set holder and a few thin shapes within the other set holder. Give various objects to the children. Ask them to place their objects within the correct set holder and state what they believe the rule to be for each set.

Have two or more children choose opposite rules, for example, large shapes and small shapes, one for each set holder, and place objects within the set holders. By asking questions, lead the other children in the group to state what they believe the rule to be for each set.

Using the Page

• Direct the children's attention to the word "Color" at the top of the page. In the first exercise, ask the children how the two shapes in the balloon are *alike*, that is, what they have in

common. Lead the children to suggest that the two shapes are both triangular. Because the two shapes are of the same color, blue, have the children color all the triangular shapes blue. After all the children have completed the first exercise, you may wish to discuss which shapes are colored and which are not colored. Explain that the ones not colored are *different* from the triangular shapes. Ask for ways in which they are different.

Have the children complete the second exercise and discuss it in a similar manner.

In the third exercise, if children choose the common property to be that the two red shapes are squares, then the rectangle should not be colored red. If they choose the common property to be that the two shapes have four sides and four corners, then the rectangle should be colored red. You may wish to point out that a square is a special rectangle. (Its four sides have the same length.)

• After you have checked the children's work, you may wish to have them consider the whole page and color all the triangular shapes blue, all the circular shapes yellow, and all the square shapes red.

LESSON OUTCOME

Identify the largest of several similar objects

Materials

box of similar objects in different sizes, display board and cutouts, crayons for each child

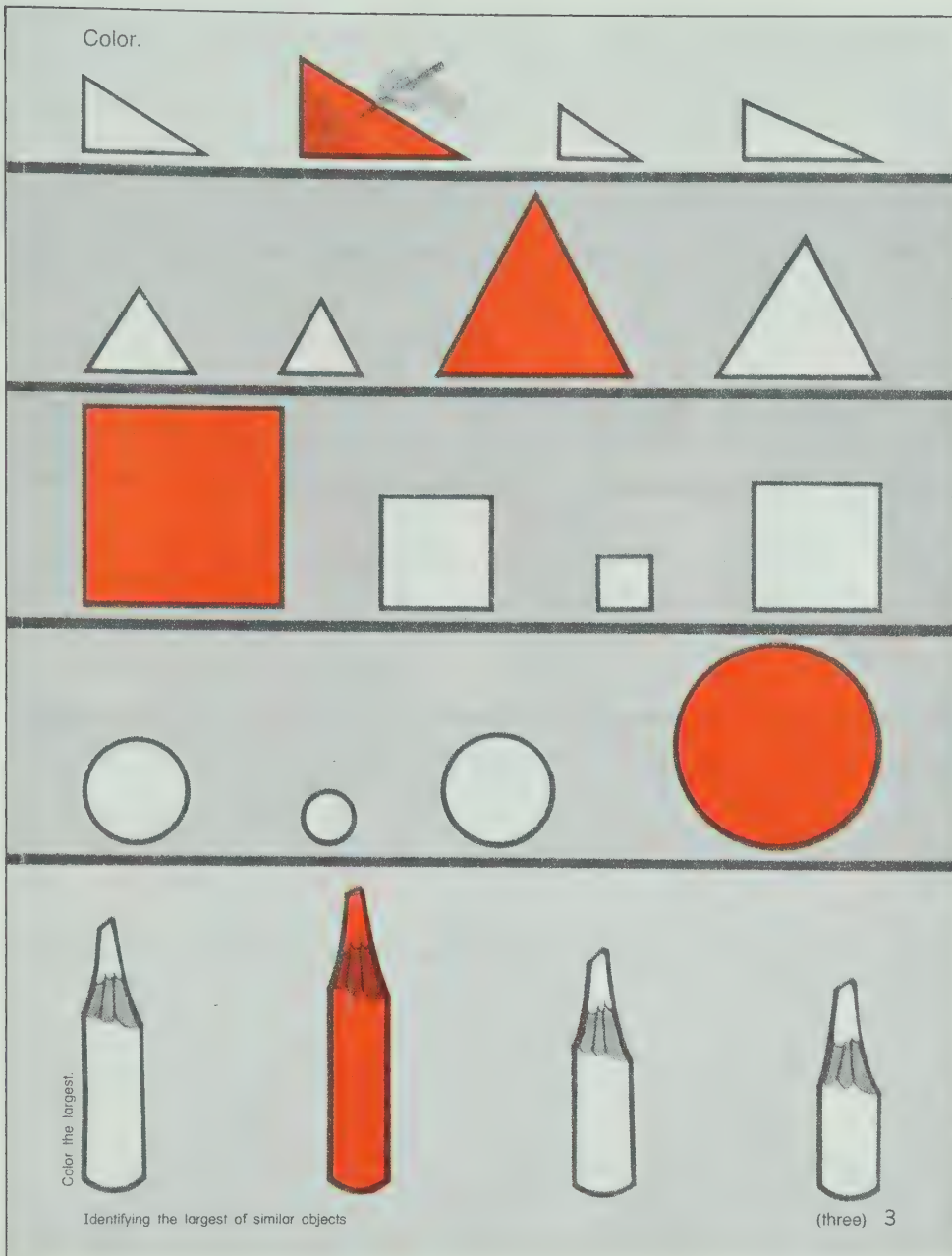
Vocabulary

large, larger, largest

RELATED ACTIVITIES

- Have the children cut pictures from magazines or catalogues of objects they consider large. Have them paste these pictures on sheets of paper to make a book. Call it "The Large Book". Print a statement under each picture; for example, "A house is large," or "A truck is large." This book may be placed in the library corner for the children to read.

- You may wish to introduce the children to other words used in making comparisons. Some of these might be tall, taller, tallest; long, longer, longest; thick, thicker, thickest; wide, wider, widest; high, higher, highest. For example, display three colored ribbons of different lengths and ask children to compare the lengths. Similarly, display three books for children to compare their thicknesses.



LESSON ACTIVITY

Before Using the Page

- On pages 3 to 5 the children will visually compare sizes of objects. More exact methods of comparing sizes will be introduced later.

Place two similar objects that are different in size in front of the children. Ask them to identify the *larger* object. After several comparisons between pairs of objects, have the children think of and name a pair of objects, one of which is larger than the other.

- Put a number of different objects in a box. Ask one child to choose one object and another child to select a larger object from the box. Repeat several times.

- Ask the children to think of and name an object that is larger than a cat, larger than a car, larger than the school, and so on.

- Ask the children to identify the *largest* of three objects placed on a table or the largest of three cutouts placed on the display board. Repeat several times.

- Ask each of three children to name an object in the classroom. Ask the other children to decide which is the largest of

the three objects. Do this a number of times until the children appear to have mastery of the concept.

Using the Page

- Direct the children's attention to the word "Color" at the top of the page. Ask the children to look at the first exercise. Ask what name is given to the shapes in this row. Draw attention to the illustration of a hand and discuss the fact that the largest triangular shape is being colored. Have the children finish coloring the shape yellow.

Ask what name is given to the shapes in the second row. Have the children decide which of these triangular shapes is the largest and then color it. You may wish to tell the children which color to use.

Follow a similar procedure for each of the other rows.

- After the children have completed the page, you may wish to point to a triangle (the first one in the second row) and ask children to point to triangles in the row that are larger. Repeat for the third triangle. They should say that there is no triangle larger than that one in this row. Follow a similar procedure for the third, fourth, and fifth rows.

LESSON OUTCOME

Identify the smallest of several similar objects

Materials

box of similar objects in different sizes, display board and cutouts, crayons for each child

Vocabulary

small, smaller, smallest

RELATED ACTIVITIES

- If you made "The Large Book" suggested on page T9, you may wish to have the children collect pictures of objects they consider small. Have them paste these pictures on sheets of paper to make "The Small Book". Print a statement under each picture; for example, "A mouse is small," or "An ant is small." Place this book with "The Large Book" in the library corner for the children to read.
- If you introduced the children to the words suggested in the *Related Activities* on page T9, you may now wish to introduce short, shorter, shortest; thin, thinner, thinnest; narrow, narrower, narrowest; low, lower, lowest.
- Cut straws or string in four or five different lengths. Have the children arrange them from shortest to longest and then paste them on a sheet of paper so that one end of each straw or string is on a common base line.

Color.

4 (four)

Identifying the smallest of similar objects

LESSON ACTIVITY

Before Using The Page

- Place two similar objects that are different in size in front of the children. Ask one child to identify the *larger* object. Ask another child to identify the *smaller* object. After several comparisons between pairs of objects, have the children think of and name a pair of objects, one of which is smaller than the other.
- Put a number of different objects in a box. Ask one child to choose one object and another child to select a smaller object from the box. Repeat several times.
- Ask the children to think of and name an object that is smaller than a house, smaller than a cat, smaller than a book, and so on.
- Ask the children to identify the *smallest* of three objects placed on a table or the smallest of three cutouts placed on the display board. Repeat several times.
- Ask each of three children to name an object in the classroom. Ask the other children to decide which is the smallest of the three objects. Repeat several times.

Using the Page

- Direct the children's attention to the word "Color" at the top of the page and, if possible, have a child read the word. Ask the children to look at the first exercise. Ask what name describes the shapes in this row. Discuss the fact that the smallest square shape is being colored. Have the children finish coloring the shape.

Ask what name is given to the shapes in the second row. Have the children decide which of these triangular shapes is the smallest and then color it. You may wish to tell the children which color to use.

Follow a similar procedure for each of the other rows.

- After the children have completed the page, you may wish to point to the fourth square in the first row and ask children to point to squares in that row that are smaller. Follow a similar procedure for the second, third, fourth, and fifth rows.

You may also wish to have the children color the largest shape in each row a particular color.

LESSON OUTCOME

Identify two objects that have the same size

Materials

blocks, similar objects of different sizes and some of the same size, display board and cutouts, crayons for each child

Vocabulary

same size

RELATED ACTIVITIES

- Have the children do more work on page 5. Ask them to choose the largest object and the smallest object in each row and to color them differently from those already colored.
- You may wish to have the children look at pages 3 and 4 and decide whether any two of the objects in each row are the same size.
- Have the children cut pictures of objects that are of the same size from magazines or catalogues. Have them paste these pictures on sheets of paper to make a book. Call it "The Same Size Book". Place this book with "The Large Book" and "The Small Book".
- Have the children turn to page 3. Discuss the shapes in each row by having children in turn point to the shapes in order of size from the largest to the smallest. A similar procedure can be followed for ordering the shapes in each row on page 4 from smallest to largest.

Color.

Color the two things in each set that have the same size.

Identifying two objects that have the same size

(five) 5

LESSON ACTIVITY

Before Using the Page

- Because the identification of objects that have the same size is a perceptual exercise, some children will have difficulty making good judgments. Start with two blocks that have the same size. Ask if one block is smaller than or larger than the other. From the discussion, try to elicit the response of "same size" from the children. Instead of blocks, you may use pencils, erasers, toy cars, scraps of wood, and so on.
- Place objects that are of the same size in a box. Include several that are of the same size as the others but are different in some way; for example, two pencils may be of the same size but of different colors. Have children select pairs of objects that are of the same size.
- Ask the children to look around the classroom and to name pairs of objects that are of the same size, for example, each of a pair of shoes, each of a pair of gloves, books, boxes.
- Place a cutout on the display board. Have children place other cutouts beside it that are of the same size.

- Form a group of four objects, two of the same size, one larger than and one smaller than the two that are of the same size. Have children select the two that are of the same size. Then have them state which is the largest and which is the smallest of the four objects. Vary this by having some children help to select the four objects for other children to discuss.

Using the Page

- Point to the word "Color" at the top of the page and, if possible, have a child read the word. Ask the children to look at the first exercise. Ask what name is given to the shapes in this row. Have them observe that the two circular shapes of the same size will be colored. Have the children finish coloring the circular shape.

Ask what name is given to the shapes in the second row. Have the children decide which two of these triangular shapes have the same size and then color them the same color. You may wish to tell the children what color to use.

Follow a similar procedure for each of the other rows.

LESSON OUTCOME

Recognize and reproduce a pattern

Materials

attribute blocks, beads and string,
parquetry blocks, gummed shapes

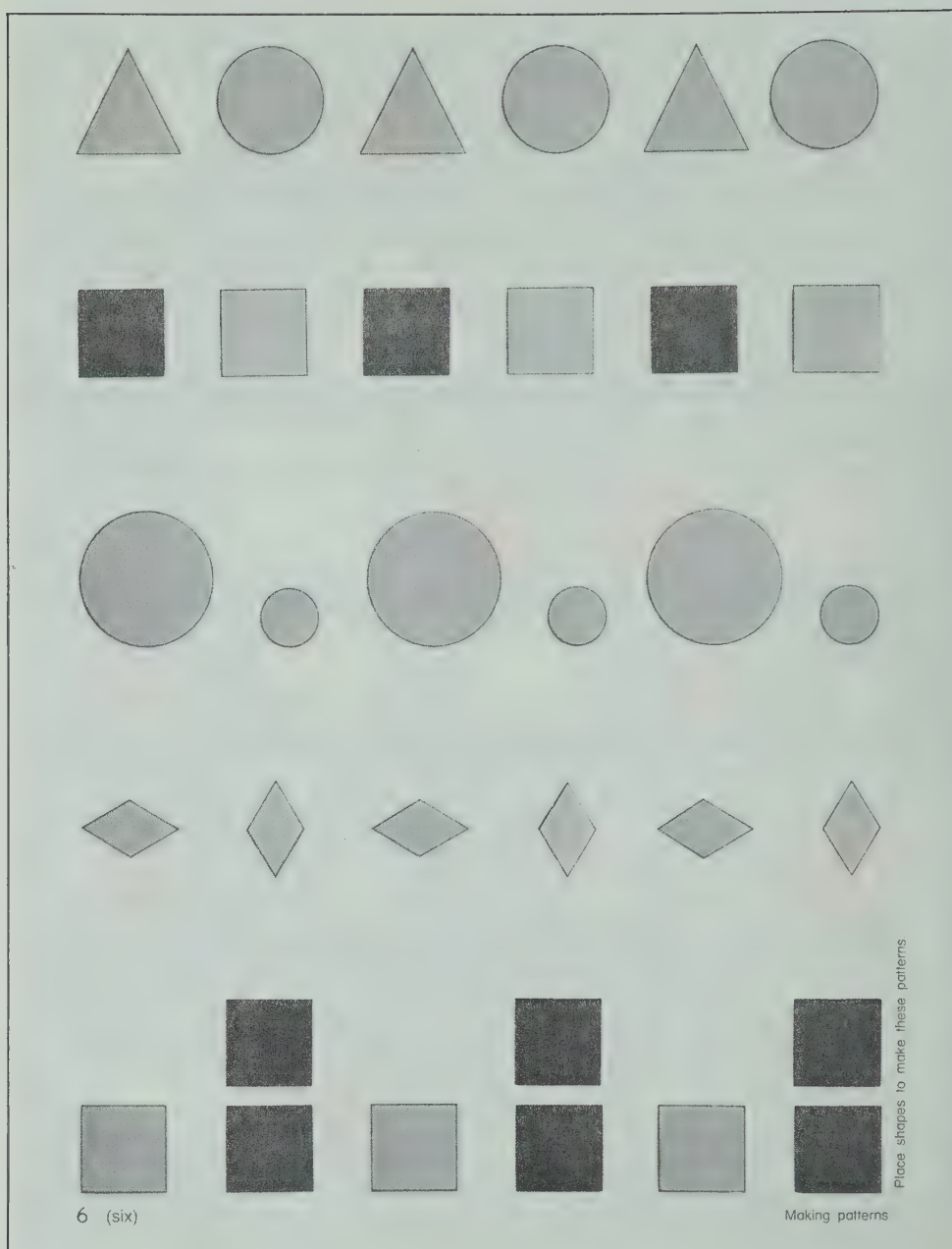
Vocabulary

pattern, repeats, diamond

RELATED ACTIVITIES

• The following are some suggestions
for other activities involving patterns.

1. Make patterns using three-dimensional shapes, for example, cone, cube, pyramid, cone, cube, pyramid, and so on.
2. Draw patterns by tracing around covers of jars of different sizes.
3. Make patterns by alternately tracing around right and left hands. Instead of tracing around their hands, the children can use finger paints and “stamp” their hands (or just a finger) on paper.
4. Cut a potato in half and carve two simple shapes. Each child can use these two shapes to make a simple potato-print pattern. One potato shape for each child can still make possible an interesting pattern if the shape is rotated from one impression to the next. A pattern similar to the “diamond” pattern on page 6 is formed.



LESSON ACTIVITY

Before Using the Page

• Use attribute blocks of two different shapes that are of the same color and size to form a pattern. For example, using only large thin red shapes, make a pattern based on square shapes and circular shapes.



Have children describe the pattern. Make several other patterns based on shape and have the children describe each pattern.

• Use objects that are of the same size and shape but of different colors to form a simple pattern. For example, make a pattern of beads using green, yellow, green, yellow, green, yellow. Discuss the pattern that the beads form. Mention that a pattern repeats. Make several other patterns based on color and have the children describe each pattern.

• Use attribute blocks that are of different sizes, but are of the same color and shape, for example, large red triangular shapes

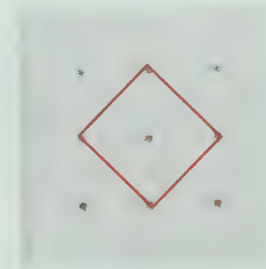
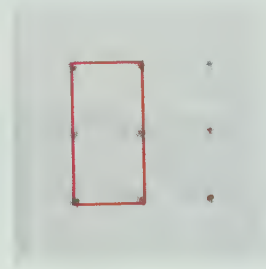
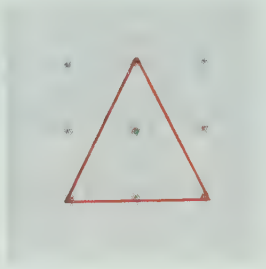
and small red triangular shapes. Have children describe the pattern. Make several other patterns based on size and have the children describe each pattern.

• Have several children use beads or attribute blocks to create patterns for other children to describe. Encourage the children to base their patterns on color, shape, or size. Creating such patterns will assist them in understanding patterns in number and geometry.

Using the Page

• If the shapes illustrated are available, have the children make the patterns shown on the page. If not, use materials that you have and let the children design their own patterns, using the ones on the page as a guide. In either case have the children describe each pattern shown on the page. They may refer to the shape in the fourth row as a diamond. Note that the pattern in the fourth row is based on color as well as *orientation* of the diamond shape. A child might describe the pattern by saying, “A yellow diamond pointing across, then a blue diamond pointing up.”

Make the shapes.



Reproducing shapes

(seven) 7

LESSON OUTCOME

Copy a design from geoboard to geoboard, from geoboard to geopaper, or from geopaper to geoboard

Materials

a geoboard and colored rubber bands for each child, copies of page T331, transparent geoboard and overhead projector (optional)

Vocabulary

geoboard, rubber band, geopaper, copy

RELATED ACTIVITIES

- Continue having the children copy designs. You may wish to use the following variations of the initial activities.

1. Have the children copy their own designs onto other geoboards.
2. Have the children use two or more rubber bands to make a design.
3. Have the children copy the designs onto geopaper.

- Test the children's ability to listen carefully and follow instructions. Display a geoboard showing a square. Ask the children to make a smaller (larger) square on their geoboards. Have them hold up their geoboards for you to check. Continue with other instructions; for example, "Make the smallest (largest) square you can."

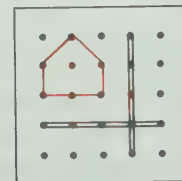
- You may wish to prepare several twelve-point geoboards and have children use them for some of the activities described on page T23.

LESSON ACTIVITY

Before Using the Page

- Give each child a geoboard and some colored rubber bands. If there is not a geoboard for each child, divide the class into small groups according to the number of geoboards you have. If you do not have geoboards, or if you prefer to have the children use geopaper, make copies of the three-by-three arrays of dots from page T331 for the children to work on.
- Display a geoboard showing a large triangle. A transparent geoboard on the overhead projector is most effective for working with a large group of children. Have each child copy the triangle in exactly the same place on a geoboard, using a rubber band of the same color. Repeat several times for triangles, squares, and rectangles of different sizes and in different positions. If the children are using geoboards with 25 pegs, show them how to use two rubber bands to mark off a section with nine pegs to match the geoboards shown on the page.
- Have the children work in pairs, copying each other's

geoboard designs. You may prefer to have the children work alone and copy designs that you have chosen.



- Display a geoboard showing a simple shape such as the one shown. Give the children copies of the three-by-three arrays of dots from page T331 and have them copy the shape. Repeat several times with simple shapes.

Using the Page

- Read the words at the top of the page to the children. Ask children to name the shapes shown on the geoboards. Have the children copy the shape shown on the first geoboard onto their geoboards. When they have completed this successfully, have them copy the shape onto the geoboard shown on the page. Repeat this procedure for the two other shapes.

LESSON OUTCOME

Recognize and copy a pattern

Materials

beads and string, attribute blocks, a sheet of paper (optional) and crayons for each child

Vocabulary

another, again

RELATED ACTIVITIES

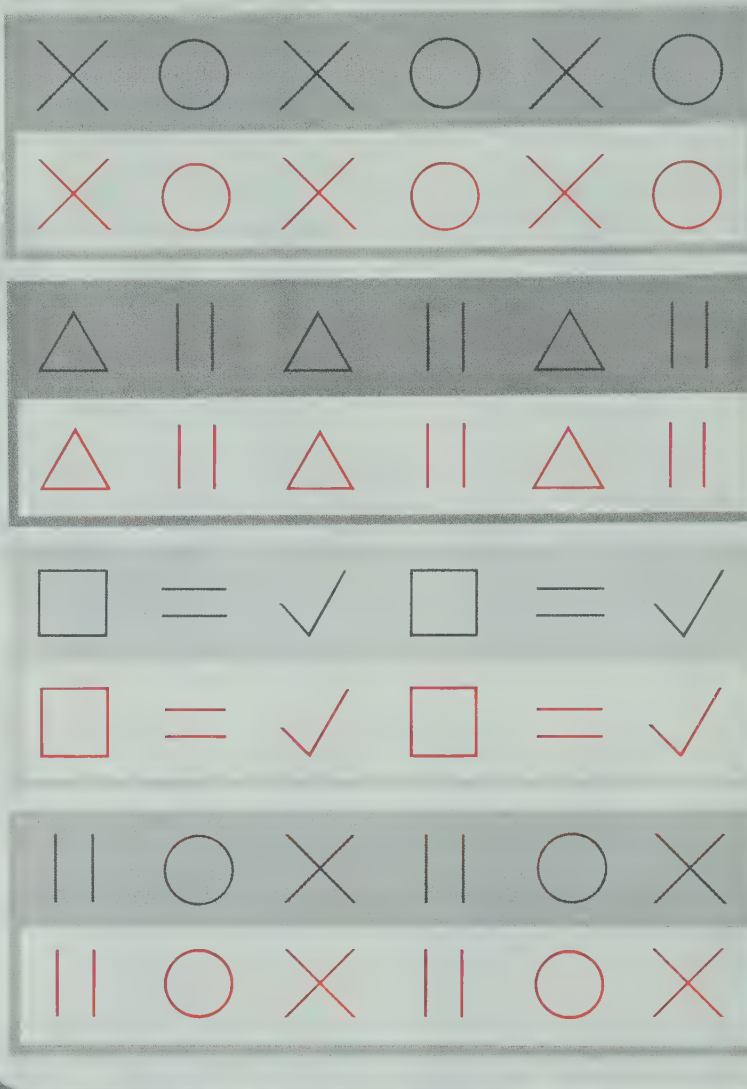
- Have children work alone, using dominoes to form a “domino train”.



If you wish to have the children play in groups, follow these rules:

1. All the dominoes are turned face down. Each player draws three of them.
2. One domino is turned over. The players take turns placing a domino from their sets to match at either end of the row of dominoes already played.
3. If a player does not have a domino to place at either end, a domino may be drawn from the pile.
4. The player who first uses all her / his dominoes wins the game.

Copy.



8 (eight)

Reproducing patterns

LESSON ACTIVITY

Before Using the Page

- Begin a sound pattern by clapping your hands and snapping your fingers, for example, clap, snap, clap, snap. Tell the children to join in as they recognize the pattern. When they have followed this pattern, stop and then start a new pattern, for example, clap, clap, snap, clap, clap, snap.
- Place beads on a string to form a pattern, for example, red, red, green, red, red, green. Ask children to describe the pattern that the beads form. Have a child select and string the beads necessary to copy the pattern. Some children may recognize that this pattern is the “clap, clap, snap” pattern in another form. Repeat with beads of other colors forming various patterns.
- Use attribute blocks to form a pattern that has two differences; that is, the pattern may be based on a change of color and shape, color and size, or shape and size. For example, using only small, thin shapes, make a pattern based on a red square shape and a blue circular shape. Have children describe the pattern and copy it. Repeat this activity several times.

- Have children use beads or attribute blocks to create patterns for other children to describe and copy. Encourage the children to create patterns based on color, shape, and size that will challenge the other children.

Using the Page

- Direct the children’s attention to the word “Copy” at the top of the page. Discuss with the children what they are to do for this page. Have the children copy each pattern in the space provided. Let the children who have difficulty controlling the size of their printing, copy the patterns on a separate sheet of paper.
- After the children have copied the patterns, have them color their circular shapes in the first exercise so that the pattern will be based on color as well as on shape. For example, ask the children to choose their favorite color and color inside each circle in their first pattern. Ask several children to describe the pattern they made. A similar procedure can be followed for the remaining exercises.

LESSON OUTCOME

Recognize and continue a given pattern

Materials

attribute blocks, display board and cutouts, crayons for each child

Vocabulary

complete

RELATED ACTIVITIES

- Have the children look for patterns in nature and the environment. They may enjoy collecting pieces of wallpaper and fabric that have patterns.
- Some children may enjoy creating patterns that can be put on cards for other children to copy and continue.
- See the activity involving dominoes suggested on page T14. A variation of this activity is to use combinations of shapes (circles, squares, triangles) in patterns that can be matched.



- See the activities involving attribute blocks suggested on page T23.

Complete.



Completing patterns

(nine) 9

LESSON ACTIVITY

Before Using the Page

- Use attribute blocks to form a pattern that has two differences, such as color and shape, or color and size; for example, using only thick shapes, show the following pattern:



Discuss the pattern with the children and ask what shape comes next. Have children continue the pattern. Make other patterns and have the children continue them.

- Show a simple pattern of shapes on the display board. The pattern may be based on color and shape, for example, a large red circular shape, a large yellow square shape, a large red circular shape, a large yellow square shape. Ask the children what shape comes next. Have children continue the pattern. Make other patterns and have the children continue them.

- Have several children take turns using attribute blocks to form a pattern for other children to continue. You may wish to have them copy some of the patterns onto paper. These patterns can be placed on display.

Using the Page

- Direct the children's attention to the word "Complete" at the top of the page. Discuss with the children the pattern that is being completed. Ask the children how they are going to continue the first pattern and then have them proceed on their own.
- After the children have completed the page, you may wish to discuss the patterns with them. Then have them color the plane shapes so that each pattern will be based on color as well as on shape. Ask several children to describe their patterns. For the fourth pattern, for example, the result might be two small green circular shapes, one large red circular shape, two small green circular shapes, one large red circular shape, and so on.

LESSON OUTCOME

Match a real object with its picture

Materials

attribute blocks, simple objects, jars and bottles with matching covers and caps, Unifix cubes and pattern-building cards, real money, play money, or coin cutouts from copies of page T337

Vocabulary

match, coins, penny, nickel, dime, quarter

RELATED ACTIVITIES

- Using construction paper of different colors, make puzzles involving shapes. Cut shapes from the paper as shown. Have the children fit the pieces where they belong.



The puzzle shown is a very simple one. You may wish to make more complicated puzzles to challenge the children.

- Have each child make a coin rubbing by placing a coin under a piece of paper and rubbing the paper with a pencil or a crayon. Both sides of the coin may be used to create a pattern. A child may also use two or three different coins to create a pattern.

Match.



Place the correct coin on each picture.

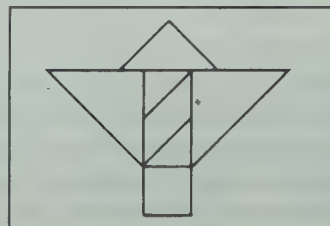
10 (ten)

Matching

LESSON ACTIVITY

Before Using the Page

- Prepare pictures by tracing around attribute blocks on sheets of paper. Have the children reproduce the pictures by placing pieces to fit the outlines. This activity is also possible using parquetry blocks, Cuisenaire rods, and tangram pieces.



- Trace the outlines of about six simple objects on a sheet of paper. Have the children place each object to fit its outline.
- Collect jars and bottles and their matching covers and caps. Have the children fit a cover on each jar and a cap on each bottle.

- Using Unifix pattern-building cards, have the children place Unifix cubes on the squares of the pattern that are of the same color as the cubes.

Using the Page

- Provide the children with real money, play money, or coin cutouts from copies of page T337. Discuss the design on each kind of coin – maple leaves, a beaver, a vessel, and a caribou. Note that the four kinds of coins are of different sizes and that one is of a different color from the others.

Direct the children's attention to the word "Match" at the top of the page. Have the children place a "real" coin on its picture.

As the children work with the coins you may want to ask questions to determine whether they know the names of the coins. For children who are ready, you may wish to tell them the names of the coins. For children who are not ready, each coin will be introduced individually in later units.

- When the children have finished placing a "real" coin on each picture, you may wish to have them draw lines to match "coins" that are the same.

LESSON OUTCOME

Establish one-to-one correspondence between the members of two equivalent sets

Materials

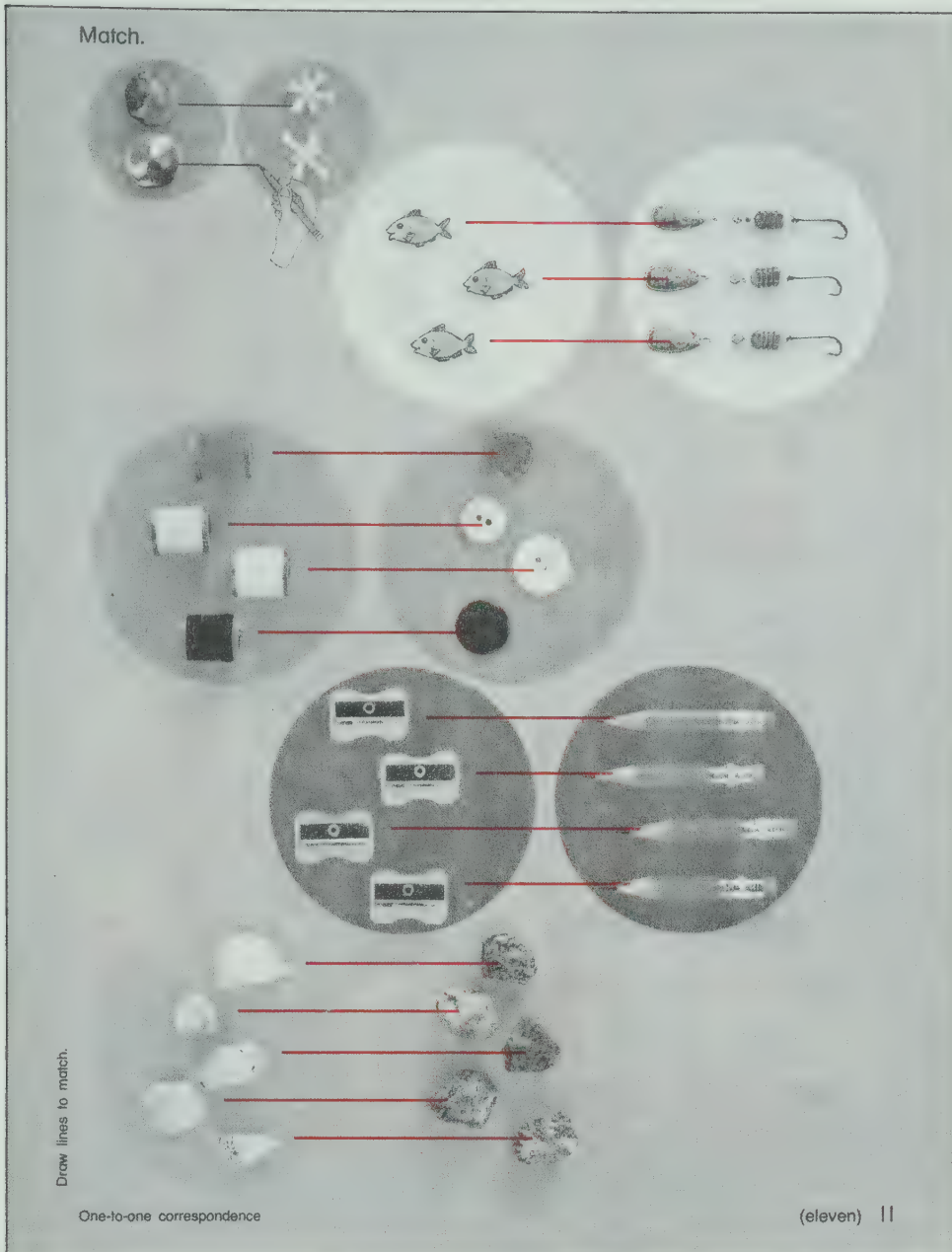
display board and cutouts, yarn or string

Vocabulary

as many as, one to one, same number

RELATED ACTIVITIES

- Tell the story *Goldilocks and the Three Bears*. Have the children draw pictures of a chair for each bear, a bowl of porridge for each bear, and so on.
- Have the children cut pictures of related objects from catalogues and paste them on sheets of paper. These can be used by other children to show one-to-one matching.
- When children distribute books or papers, one to each classmate, they are experiencing one-to-one matching. Emphasize the relationship on occasions when children are doing activities that require one-to-one matching around the classroom; for example, putting one brush beside each paint pot or giving scissors to each child.



LESSON ACTIVITY

Before Using the Page

- On the display board, place pictures of things that are associated together, for example, dogs and bones. Display as many bones as there are dogs. Have children take turns matching a dog and a bone. They can use pieces of yarn or string to show the matching. Then ask the children if each dog has a bone, if there is a bone for each dog, and if there are *as many bones as* dogs. Repeat with other examples for matching. Some of these can be squirrels and trees, rabbits and carrots, cups and saucers. After the matching is completed, point out that because there is a squirrel to match each tree, there must be *as many* squirrels as trees. You may wish to introduce the idea that there is the *same number* of squirrels and trees.
- Have the children join hands to match themselves one to one. You may need to take part in the matching if there is one child without a partner.

Using the Page

- Direct the children's attention to the word "Match" at the top of the page. Discuss with the children the example that is being completed and then have them draw lines for matching members in the two sets. Some children may show matchings that are different from those given as answers. For example, the first object in a set may be matched with the last one in the other set. Such answers are acceptable because the way in which the members of two sets are matched does not affect the equivalence of the two sets.

If no children show matchings done in different ways, present an example and have the children match in a different way. Make them aware that the way the members are matched has no effect on the one-to-one relationship.

LESSON OUTCOME

Form a set equivalent to a given set and establish one-to-one correspondence

Materials

display board and cutouts, yarn or string; small objects, a sheet of paper and crayons for each child

Vocabulary

draw

RELATED ACTIVITIES

- Have the children draw several houses. Have them cut a picture of a person for each house from a catalogue or a magazine. The children can paste the cutouts beside the houses and then draw lines to match the objects one to one.
- Have the children use plastic or paper plates, knives, forks, spoons, cups, and serviettes to set a table. Have three children set out the plates, place one fork on or beside each plate, and place the knives so that there is one for each plate. Have other children distribute the rest of the objects in a similar manner. Ask questions such as: "Are there as many knives as there are forks?" "Are there as many spoons as there are cups?" "How can you show that there are as many spoons as there are cups?"

Draw.

12 (twelve)

One-to-one correspondence

Draw lines to match. Draw a set with the same number of shapes.

LESSON ACTIVITY

Before Using the Page

- Ask five children to stand at the front of the classroom. Place five books on a table. Ask other children if there are as many books on the table as there are children. Ask them how they could find out. Have a child give one of the books to each of the five children to show the equivalence of the two sets. (Note: Equivalent sets have the *same number* of members. Avoid the use of the word *equivalent* with the children.)
- Place two equivalent sets of cutouts on the display board, for example, chickens and eggs. Have the children use pieces of yarn or string to match one to one. Take away the pieces of yarn and the eggs. Now have the children place a piece of yarn for each chicken. Have other children place an egg to correspond to each chicken. Use other cutouts and give as many children as possible a chance to make an equivalent set.
- Have the children use small objects to make a set at their desks. Have them make a second set equivalent to the first one by matching.

- Have the children fold a piece of paper in half and draw some birds, for example, on one half of the paper. Have the children exchange their papers, draw lines for matching, and then draw a worm for each bird.

Using the Page

- Direct the children's attention to the word "Draw" at the top of the page. Discuss with the children the example that is being completed. The instructions for the page suggest drawing first the lines for matching. If you wish, you may have the children draw the objects on each paint tube first and then draw the lines for matching.

If some children already know how to count, they will probably count the objects in the set, count as they draw an equivalent set, and then draw the lines.

LESSON OUTCOME

Form a set equivalent to a given set

Materials

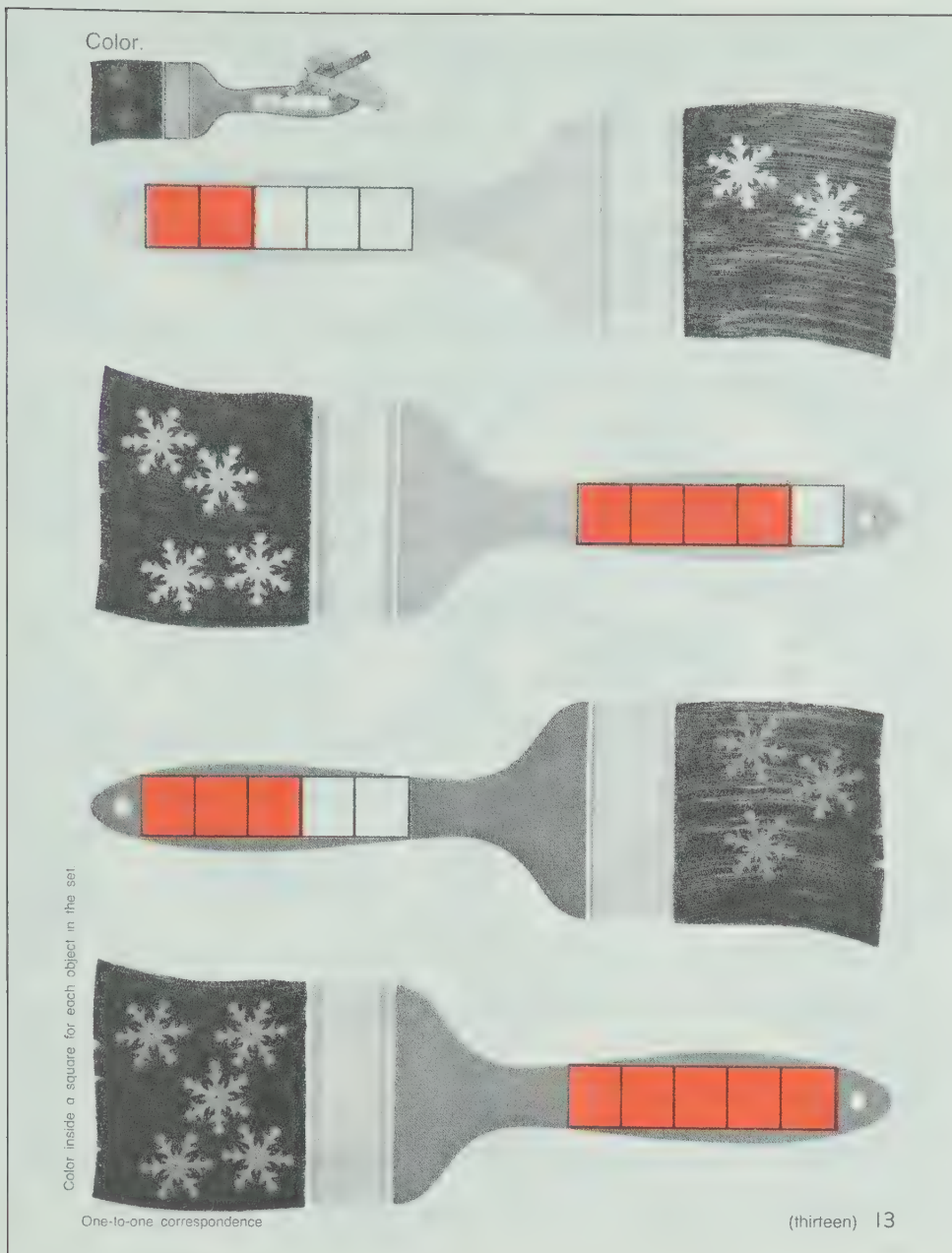
display board and cutouts, gummed shapes, a large sheet of paper, a sheet of paper and crayons for each child

Background

This page extends the idea of forming equivalent sets as presented on page 12. It is an important step in preparing for the introduction of number concepts and counting. This page also provides a basic foundation for graphing.

RELATED ACTIVITIES

- Mark a sheet of paper into four equal parts. Draw, trace, or paste several farm animals in each "field". Make copies for the children and have them draw pebbles for the animals in each field, for example, ●●●. If you have toy farm animals, you may wish to adapt this activity so that the children can work with them.



LESSON ACTIVITY

Before Using the Page

- On the display board, place a set of cutouts arranged horizontally. Ask a child to place one square shape on the board for each cutout. Ask another child to show a one-to-one matching to check that the two sets are equivalent. Repeat several times with other sets of cutouts, helping the children to arrange the square shapes horizontally.
- Fold a large sheet of paper in half. Have one child draw a set of objects on one half of the paper. Have another child place a gummed shape on the other half of the paper, so that there is one for each object in the first set. Assist the child in arranging the gummed shapes horizontally. Have another child show the lines for matching one to one.
- Repeat the above activity by having each child in the group fold a sheet of paper in half, draw a set of objects on one half, and exchange the paper with another child. Now have the children place a gummed shape for each object in the set and draw lines for matching one to one.

- Tell the children about the precounting activity of tallying. For example, to count sheep a shepherd might put a notch in a piece of wood or put a pebble in a bag for each sheep in the flock. When each sheep was matched with a notch or a pebble, the shepherd could tell whether any sheep were lost. To demonstrate the idea of tallying, form small groups of children, a different number in each group. For the first group, draw a pebble on the chalkboard as each child in the group says her/his name. Repeat for each of the other groups.

Using the Page

- Ask a child to read the word "Color" at the top of the page. Have the children color inside a square for each snowflake in each set. Encourage the children to color inside consecutive squares, starting at the square on the left.

LESSON OUTCOME

Use one-to-one matching to determine which of two sets has more members

Materials

display board and cutouts of balls and bats, yarn

Vocabulary

more than, mark

Background

We can determine whether two sets are equivalent without counting by matching the members one to one. If the members do not match one to one, the sets are not equivalent, and one set has more members than the other. For comparisons between two sets that are not equivalent, we use the words “more” and “fewer”. (Remember that “greater than” and “less than” are used only for comparing numbers.)

RELATED ACTIVITIES

- Prepare a tally box for the members of your class. On a day when everyone is present, give each child a counter. An empty box is carried around and each child drops the counter in. On the following day, the box is carried around and each child removes one counter. Have the children discuss the significance of no counters left in the box or some counters left in the box. After the discussion, all the counters are returned until the following day.

LESSON ACTIVITY

Before Using the Page

- Display cutouts of five balls and four bats. Ask the children whether there is one bat for each ball. They probably will guess at first. Then have them place one ball beside each bat. When they realize that there is one extra ball, lead them to state that there are more balls than bats. Repeat with other sets of balls and bats, or use other objects suitable for matching.
- Place four chairs at the front of the classroom, not necessarily in a row. Ask six children to come to the front of the classroom. Ask the other children if there are as many chairs as there are children and how they could show this. Emphasize that *one to one* means there is one chair for each child. Ask if there are more chairs or more children. Repeat with similar examples and then with examples in which there are more chairs than children.
- Place two sets that are not equivalent on the display board. Have children take turns using pieces of yarn to match the

Match and mark.

14 (fourteen)

Understanding the concept *more than* through matching

objects one to one. Have them state which set has more members than the other.

Using the Page

- Direct the children's attention to the words at the top of the page. Discuss with the children the example that is being completed. Have the children draw lines to match the objects in each pair of sets and use a ✓ to show the set that has more members than the other. If necessary, remind the children that an object in a set can be used only once when matching one to one.

LESSON OUTCOME

Use one-to-one matching to determine which of two sets has fewer members

Materials

display board and cutouts of trees and apples, yarn, small objects for matching, overhead projector

Vocabulary

fewer than

Background

One-to-one comparisons between sets, used in determining *more than* and *fewer than* relationships, will be used later in developing *greater than* and *less than* relationships between two numbers. Each relationship can be stated in two ways: set A has more members than set B; set B has fewer members than set A.

RELATED ACTIVITIES

- Have the children play the game "Musical Chairs" in the gym or in the classroom. Arrange chairs so that there will be one chair for each child except one. The children march around the chairs while music is playing. When the music stops, each child sits on a chair. The child not matched in this way to a chair sits on the floor for the remainder of the game. Then take away one chair and continue the game until there is only one child sitting on one chair.

Match and mark.

Draw lines to match. Use a / to show the set that has fewer than the other.

Understanding the concept fewer than through matching

(fifteen) 15

LESSON ACTIVITY

Before Using the Page

- Display cutouts of five trees and three apples. Ask children which set has more objects. Have children place pieces of yarn to match trees with apples to check the answer. Having established which set has more than the other, point out that we can say, "There are *fewer* apples than trees." Repeat this activity with other sets of objects. Encourage the children to state each relationship in the two ways, but emphasize the use of the word "fewer", particularly with children who may be unfamiliar with it.
- Place a set of objects on a table. Ask one child to use other objects to make a set that has fewer objects than the first set. Have another child match the objects one to one. Repeat with other sets.
- Prepare several acetate sheets for use with the overhead projector. On each sheet show two non-equivalent sets, each set in a different color. Ask the children which set has fewer objects. Ask a child to show the lines for matching, using either chalk

on the image on the chalkboard or pieces of yarn on the acetate sheet. Straws may be easier to place in position than yarn.

Using the Page

- Direct the children's attention to the words at the top of the page. Discuss with the children the example that is being completed. Emphasize that, for this page, the / shows which set has *fewer* members. Have the children draw lines to match the objects in each pair of sets and use a / to show the set that has fewer members than the other. If children have difficulty with the concept *fewer than*, you may wish to have them use an X to show the set in each pair that has more members than the other. Then they could use a / to show the set that has fewer members than the other.
- After the children have completed the page, you may wish to have them refer to page 14 and answer questions about which set in each pair has fewer members than the other.

OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

Materials

display board and cutouts

RELATED ACTIVITIES

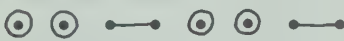
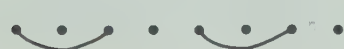
- Cut copies of page T341 into strips of two rows with nine or ten squares in each row. Give one strip to each child. Have the children draw symbols in the first six squares of each row to show a pattern. Then have them exchange strips and complete the patterns.

○	X	○	X	○	X				
✓	△	✓	△	✓	△				

- Adapt the preceding activity and have children work in pairs to find which of their first names has more (fewer) letters and which have the same number of letters.

E	r	i	c				
A	n	g	e	l	a		

- Have the children draw patterns on copies of page T333.

1. 
2. 

LESSON ACTIVITY

Before Using the Page

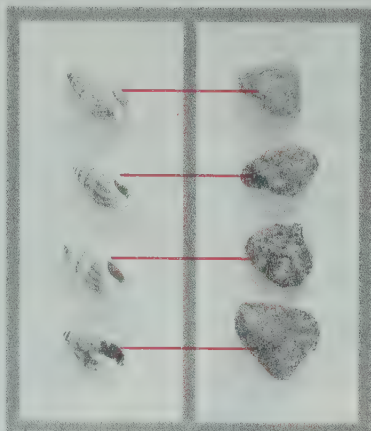
- Page 16 is a review of major pre-number concepts introduced in Unit 1: relationships that are determined through one-to-one comparisons between sets; recognizing and continuing a given pattern. Because these concepts were dealt with most recently in the work of Unit 1, preliminary activities will not likely be necessary, except perhaps for a few children. You may wish to review the concepts *more than* and *fewer than* on the display board.

To review these concepts as they appear on the pages of the student's book, direct the children to turn to page 9, and ask a few children to describe in their own words the task that was presented and the procedure they used to complete it. Repeat this for pages 11, 12, and 15.

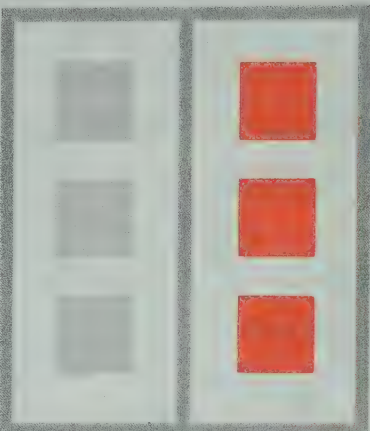
Using the Page

- Begin by drawing attention to the word *Checkup* at the bottom of the page. Tell the children that such pages throughout the book help them to check their understanding of the work

Match.

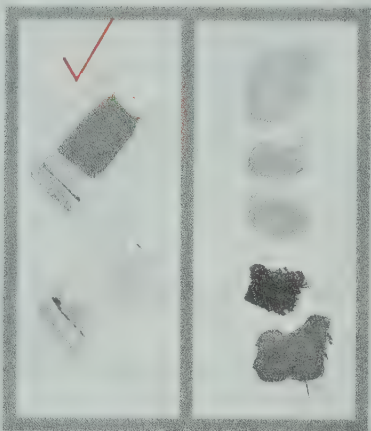


Draw.




Draw lines to match. Draw a set with the same number of objects.

Mark.




Mark.



Use a ✓ to show the set in each pair that has fewer than the other.

Complete.



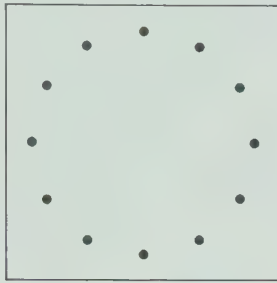
16 (sixteen)
CHECKUP

they are learning. Tell them that sometimes they will work alone on the *Checkup*; at other times you will guide them in completing the exercises on the page. Because this is the first of such pages, discuss with the children each exercise in turn, reading the word that precedes each exercise, or asking a child to read it. However, elicit from the children, where possible, what is required. Note that for the third and fourth exercises, they are to mark the set that has fewer objects.

Games and Activities

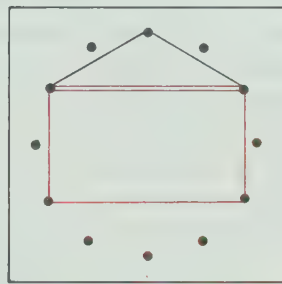
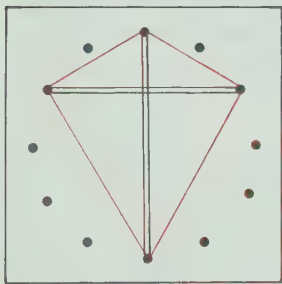
Twelve-Point Geoboard (Activity for page 7)

Use a pattern similar to the following to prepare geoboards having 12 pegs equally spaced to suggest a circle.

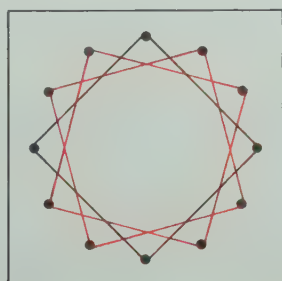
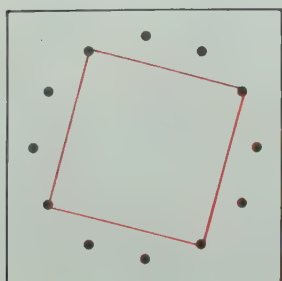


Geoboards of this type are versatile. Because there are no pegs within the circle, children can focus more easily on the sides and the corners of a shape. The geoboards can be used to show line segments, and shapes having from three to twelve sides. It is possible to show shapes having all sides equal in length if the number of sides is 3, 4, 6, or 12. Later, the geoboard can be adapted for showing time, to the hour, and for showing halves and fourths of a whole. The activities listed below are suitable for the introduction of the twelve-point geoboard.

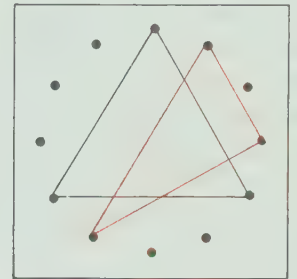
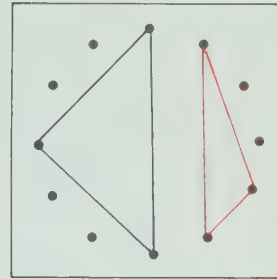
1. Begin by having the children create their own designs. They may wish to describe their designs to you and to other children.
2. Ask the children to make a specific design such as a kite or a house.



3. Show a shape on the geoboard. Have the children copy the shape in the same place on their own geoboards.
4. Show a shape on the geoboard. Have the children copy the shape in a different place on their own geoboards.
5. Ask the children to show the smallest triangle, rectangle, or square that they can.
6. Ask the children to show the largest triangle, rectangle, or square that they can. This activity and the preceding ones will enable children to discover that only one size of square can be shown on this type of geoboard.



7. Ask the children to use rubber bands of different colors to show all the squares that they can. The result will present a pleasing design as shown above.
8. Have the children work in pairs, using one geoboard, so that one child shows a triangle and the other child shows a different triangle. Have them repeat this several times.



Attribute Challenges (Activity for page 9)

1. Sort the blocks according to the following four ways: size (large, small); thickness (thick, thin); color (blue, red, yellow); shape (circle, rectangle, square, triangle).
2. Use all the thick blocks or all the thin blocks. Develop a "one-difference train" with the children in the following way:
 - a. Choose any block and have children describe it, for example, a large red square shape.
 - b. Place a block next to it that is different in only one way (color, shape, or size). Say, for example, "The next shape will also be red, and it will also be square, but it will be of a different size." (small red square shape)
 - c. Place a third block next to the second block so that there is one difference between the second and third blocks. Say, for example, "The next shape I choose will also be small, and it will also be square, but it will have a different color." (small blue square shape)



As the children begin to understand that only one attribute may change each time, have them continue the "one-difference train" as far as they can on their own. They may repeat this activity several times using a different block as the first block of the train.

3. Adapt the preceding activity to develop a "two-difference train" or a "three-difference train". For a "four-difference train" have the children use the whole set of attribute blocks.
4. To encourage recognition of the four attributes of each block, name four attributes in turn and have the children point to the correct block. Say, for example, "It is large. It is red. It is thin. The shape is a triangle."
5. Display only the large thin blocks. These blocks will differ only in color and shape. Ask the children to shut their eyes as you remove one block. Then ask them to open their eyes and determine which block is missing. The child who identifies the missing block, may remove the next block to be identified. (The missing block should be returned to the group after it is identified.)

Unit 2 Overview

In this unit the concepts, numerals, and word names for the numbers one to five are presented in sequence so that children can see and appreciate that each number is one greater than its predecessor. Opportunities are given for the children to represent numbers by drawing sets having from one to five members. Subsets are identified in sets having from three to five members as a background for the discovery of basic addition and subtraction facts. The ordinal number concepts *first* to *fifth* are also introduced in this unit so that children may learn both the cardinal and ordinal aspects of the numbers. Measurement topics include parts of the day and the use of a penny to represent a value of one cent. Two-dimensional shapes are examined to discover the number of sides and the number of corners of each. The *Checkup* at the end of the unit deals primarily with numbers, their concepts, numerals, and word names.

Unit Outcomes

Number

- identify and record the number of a set having from one to five members
- recognize and print the numerals from 1 to 5
- recognize the words from *one* to *five*
- draw sets having from one to five members
- show number combinations for three, four, and five
- understand the ordinal number concepts to *fifth*

Measurement

- classify events as taking place in the morning, afternoon, or evening
- recognize a penny and know that its value is one cent
- associate pennies with the price of an item from 1 cent to 5 cents

Geometry

- identify the number of sides and the number of corners of a two-dimensional shape

Background

Number: The development of number concepts begins with *one* and continues through the succeeding numbers using the idea “and one more”. One-and-one-more becomes two, two-and-one-more becomes three, and so on. A number concept is an abstract idea drawn from many concrete experiences. By working with many different sets of two, for example, children begin to recognize the common feature of “twoness”, the cardinal concept of number by which the question “how many” is answered. The children work with sets of from one to five and learn to use the number names, to recognize and print the numerals, and, if they are ready, to read the words for the numbers.

Counting involves a one-to-one correspondence between the members of a set and numbers used in their natural order. This unfortunately establishes an order for the objects being counted and tends to create a point of confusion for the children between the cardinal and ordinal aspects of number. For example, in counting a set of five members, the numbers “one, two, three, four, five” are used as each member is considered, and the last number used identifies the number of objects in the set.

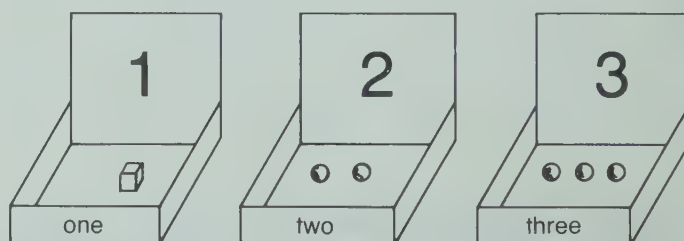
Thus the *fifth* member that is counted is called “five”, but by itself it is not “five”. It is important to provide experiences that enable children to distinguish between the cardinal and the ordinal aspects of number and to realize that in counting the members, the last number used refers to the size of the set.

Although the approach to numbers in this unit emphasizes the “and one more” idea for each successive number, children are also made aware that there are other combinations. For example, the number 4 is seen as 2 and 2, as 1 and 3, and as 3 and 1. This incidental work helps to lay a foundation for addition and subtraction facts of, in this case, 4.

Children are encouraged to exercise care when printing numerals by a system of colored dots and arrows: start at the green (go) dot, follow the yellow arrows, and end at the red (stop) dot. Each time a numeral is introduced, children should practise printing the numeral on a sheet of paper before they print or paste their “best” numeral on the page. If you wish, you may have the children practise on the appropriate strip for each numeral cut from copies of page T335.

The concept of number may be reinforced in many ways. Games that require special dice (make these from small wooden cubes available commercially) appear on pages of the textbook; other games, stories, and poems are suggested in *Related Activities*.

Children make their own *number concept cards* from index cards (see page T31) and these are used in lessons that follow. Experience with numbers in sequence is suggested through the use of *number trays* for *one* to *five*. (They are extended later to include 0 and the numbers to 10.) The trays are made from shallow boxes on which the numerals are printed. Each day a child is asked to prepare the number trays by setting them out in order and filling them with the appropriate number of small objects. This kind of experience prepares children for the concept of the number line and reinforces the cardinal and ordinal number concepts.



Measurement: The relative ideas *large* and *small* are reviewed. Informal games and discussion are recommended for the development of these ideas, so that through repeated use children will learn to use them correctly. Also, activities are suggested to extend the concepts *large* and *small* to more specific ideas such as *thick* and *thin*, *tall* and *short*, *high* and *low*.

Children of this age are familiar with the terms *day* and *night* and associate them with the light and dark periods. Children may not understand the meaning of a calendar day. For them the earliest concepts of time are generally related to events of the day that occur in a fairly regular pattern. Time during the day is frequently indicated in relation to these “time-posts” by the use of the words *before*, *after*, and *until*: “You may play outside until supper”; “You must pick up your toys before you go to bed.” Then, gradually, children adopt the terms *morning*, *afternoon*, and *evening* to denote parts of the day.

Duration of time for periods shorter than a morning, afternoon, or evening may be a more difficult concept for children to grasp because there are so many factors that influence their judgment. For instance, time is short when they are doing things they enjoy, no matter how much time has elapsed. Similarly, time is long if they are anxious to move on to a new activity. Thus, the terms *long time* and *short time* are only relative terms, which vary from one situation to another. By using these terms in a variety of situations and through discussion, children can learn to use them with understanding.

There may be considerable variation among children in their previous experiences with money. Some may be quite familiar with coins and their values because of allowances or coin banks; others may have had little or no experience. The penny is introduced on page 37 and is used to provide more experiences with sets of one to five. Children may need help in distinguishing between the *name of the coin* (penny) and its *value* (one cent). For example, an item costing three cents (value) is paid for with three pennies (coin). Either real or play money can be used for play experiences with money, but each child should have some opportunity to handle real coins to become familiar with their color, size, and appearance.

Geometry: Polygons having three, four, and five sides are included in this unit to reinforce the number concepts to five as well as to introduce the terms *sides* and *corners* (vertices) associated with the figures. Through play and the activities suggested, children may make discoveries about polygons; for example, the number of sides of any polygon is the same as the number of vertices of that polygon.

Teaching Strategies

The skill of reading words for numbers is optional at this stage because some children will not have reached the readiness level. However, as suggested in the overview for Unit 1, it is recommended that you reinforce recognition of these words and also the words in the instructions that appear at the top of textbook pages by reading and discussing them when beginning the work on each page. In this unit, such words as *mark*, *print*, *draw*, *how many*, and *tell* appear several times.

Children who experience difficulties in printing the numerals, may be assigned to small groups for remedial instruction. Large numerals cut from sandpaper or fashioned from Plasticine offer a tactile approach and are valuable, especially for those children who have a tendency to reverse a numeral. Children may trace each sandpaper numeral with their fingers again and again. Then they may form the numerals on their desks with their fingers, or in finger paint on paper, or in instant pudding contained in a shallow pan. Finally, they may use a pencil to print the numerals on paper.

A discussion of the pictures on a page can promote incidental learning of certain concepts. For example, because the houses at the top of page 30 can be referred to by color, the discussion can involve the ordinal number concepts first, second, third, and fourth.

Since geoboards and attribute blocks are required for some pages, it may be necessary to work with small groups of children.

If children will be playing the games on pages 19, 22, 26, 30, and 34 in pairs, you may consider teaching a small group how to use the special dice for the game and then have these

children in turn become one of a pair who teaches other children how to play. A child who understands is paired with one who has difficulty or does not understand. Children of different abilities can enjoy working together and learning from each other.

Materials

- display board and cutouts
- items for making sets, devices for set holders
- magazines, catalogues, scissors, paste, crayons
- number trays for *one to five*, labels
- flash cards for the numerals 1 to 5 and the words *one to five*
- flash cards for the words *first*, *second*, *third*, *fourth*, *fifth*
- flash cards for the words *sides* and *corners*
- specially marked dice or condition cards for the games on pages 19, 22, 26, 30, and 34
- index cards for children to use for making number concept cards
- specially marked sheets of paper for children to practise printing 2, 3, and 5
- strips for printing numerals from copies of page T335
- attribute blocks or suitable substitute
- geoboards, rubber bands, three-by-three arrays of dots from copies of page T331
- transparent geoboard and overhead projector (optional)
- pictures of activities associated with different parts of the day
- real money, play money, or coin cutouts from copies of page T337
- objects having tags with prices from 1¢ to 5¢ for a play store

Vocabulary

dot	five
arrow	first
trace	second
print	third
tell	fourth
sides	fifth
corners	opposite
penny	one more
cents (¢)	how many
price	morning
one	noon
two	afternoon
three	evening
four	

Unit 2 Theme – Me

The purpose of this theme is to help the children get to know themselves and to see themselves in relation not only to other members of their families but also to friends and to their environments.

LANGUAGE ACTIVITIES

1. The Beginning of Me

Discuss with the children what they were like as babies and things related to babies, such as their size, food, clothing, activities, and sounds. Discuss especially how they had to be cared for by someone else. Then discuss how they have changed in six years. Try to elicit physical changes as well as changes in interests and independence.

Have each child use illustrations to make a “Then and Now” chart comparing appearance, food, activities, and clothing.

2. I See Me

Have the children repeat this poem in front of a mirror. Encourage them to perform the actions suggested in the poem.

THE ME THAT I CAN SEE

In the mirror I can see
A copycat who plays with me.
I wrinkle my nose and he does, too.
His mouth gets round when I say, “Boo!”
I waggle my tongue like this and that.
And so does he, that copycat.
He has my teeth, my ears, my eyes,
And everything is just my size.
Who is that copycat I see?
That copycat I see is me!

From Volume 14 of *Childcraft – The How and Why Library*.
© 1981 World Book – Childcraft International, Inc.

3. Me in My Family

Discuss with the children the idea of family and encourage them to define the term *family*. You should get many varied definitions. Explain that “family” means different things to different people and that there are many different kinds and sizes of families.

Have the children suggest different family groupings: mother, father, and children; single parent and child; two parents and one child; one parent and several children; foster parent and foster child; adoptive parent and adopted child.

Encourage the children to discuss how many members there are in their own families. Notice whether the children include themselves when considering the members of their own families. Also note whether they can tell which children in the family are older or younger than they are and whether they know the ages of their brothers and sisters.

Have each child draw a picture of her/his family. Have the children draw a ring around themselves. You may wish to use the pictures for a bulletin board display illustrating “All Kinds of Families”.

4. With My Friends

Begin a discussion about having friends. You may wish to consider questions similar to the following:

“How do we choose friends?”

“How can you be a good friend?”

“What things do we do together with friends?”

“How can you make new friends?”

Develop the idea that there are some things we do alone, but friends make doing some things more fun. Playing baseball isn’t much fun alone!

Build a chart with the children using pictures from magazines for illustrations. Have each child contribute something he/she does alone and something he/she does with a friend. Display the chart so that the children can see the variety of activities represented.

5. Pretend a Friend

Have the children look through magazines until they find a picture of someone whom they would like to have as their friend. When each child has found a picture, make a collage on the display board. Ask the children to tell you why they chose the pictures they did. From the discussion, list the ingredients for a “recipe” for friendship.

6. How I Feel

Have the children suggest feelings that they have at various times. List the words the children suggest, for example, *happy*, *sad*, *excited*, *angry*, *scared*. Have the children share situations that elicit these emotions. Make it possible for all the children to share at least one emotion together. Be sure the children realize that everyone experiences these feelings at one time or another.

Ask each of several children to choose a feeling, or a situation in which the feeling was experienced, and act it out for the other children in the class. Encourage the actors to use exaggerated facial expressions but no verbal expressions. Have the other children guess what feeling is being expressed.

Select five or six of the most common feelings that children experience. Make a simple face symbol to illustrate each.



happy



sad



angry

Have each child make a book to illustrate feelings that he/she has experienced. Have the children use one page for each feeling selected to illustrate a situation that makes her/him feel that way.

7. My World of If

Encourage the children to relate to a variety of magical and fantasy situations. Allow the children to indulge in creative and imaginative thinking. Propose some “ifs” similar to these:

“If you could be of any size, how big would you be?”

“If you could be a cloud, what would you do?”

“If you could have anything for breakfast, what would you have?”

“If you could make only one sound, what would it be?”

“If you could go away for one day, where would you go?”

8. What's in a Name?

Begin a discussion about the meanings of names. Ask children if they know what their names mean; for example, "Colleen" means "girl", "Donna" means "lady", "Sophia" means "wisdom", "Charles" means "strong", "Edward" means "guardian of property", "Neil" means "courageous".

Provide a dictionary of names for the children to find out what their names mean. Encourage the children to ask their parents why they were given their names. Make a list of the children's names and their meanings.









Have the children trade names with a classmate for a few hours. After the children resume the use of their own names, ask them to describe how they felt when they had someone else's name. Ask children what name they would choose if they could have any name they wished.

MATHEMATICS ACTIVITIES

Again, because the children's knowledge of number may be minimal, the activities suggested involve only the counting numbers to five and comparison of sizes.

1. Counting Body Parts

Prepare a chart similar to the one given below for each child. Have the children record the number that they have of each.

After the children have completed the charts, ask questions similar to the following:

- "Which of the parts do you have only one of?"
- "Which of the parts come in twos?"
- "Do you have more than two of any of the parts?"
- "Which of the parts do you use when you smile?"
- "What do we have so many of that it would be difficult to count them?"

2. Where Do I Fit?

Children can get an idea of their own size by relating to objects that are bigger than or smaller than they are. Play the game "Bigger or Smaller". Prepare two large flash cards – one with the word *bigger* and the other with the word *smaller*. Hold up a card and say a child's name. That child then stands beside something in the classroom and makes a statement about its size in relation to herself/himself; for example, "The door is bigger than I am." You may wish to record some of these relations on a large sheet of newsprint.

3. Number Stories

Provide pictures similar to those at the top of pages 20, 23, 27, and 31, or ask the children to bring photographs of themselves and family members or friends. Have children interpret the situations shown in the pictures. Help them focus on the numbers suggested by the pictures. For example, "Three children are at the beach. Two children are in the water and one is playing in the sand."

SCIENCE ACTIVITIES

Shadows have a mysterious and magical quality for young children. Begin by discussing the idea of a shadow. Make sure that the children have a basic idea of what a shadow looks like. Read the poem *My Shadow* by Robert Louis Stevenson.

1. When Can You See a Shadow?

Choose a day that promises to be sunny. Take the children out to the playground at the beginning and the end of the morning and the beginning and the end of the afternoon. Ask questions similar to the following:

- "When are there no shadows?"
- "When are there the best shadows?"
- "Where should you stand to get a shadow?"

Have the children discover when their shadows are long and when they are short. Have children compare the lengths of their shadows.

2. What Is Your Shadow Like?

Make a chart with the children and record their impressions of shadows from the previous activity. Encourage them to think about their own shadows. The children may make comments such as:

- "My shadow doesn't show my clothes."
- "My shadow is black."
- "My shadow doesn't have a face."

3. What Can Your Shadow Do?

Using the information from the first activity on the best time for shadows, return to the playground. Have the children explore what their shadows can do. Ask questions similar to the following:

- "Can you catch your shadow?"
- "Can your shadow jump?"
- "Can you hide your shadow?"
- "Can you make your shadow cover another's shadow?"

4. Shadow Pictures

Using a flashlight or a slide projector, cast a light on a blank sheet of paper attached to a wall. Let the children discover the shadows that they can cast with their hands. Have them try to make different animals.



You may wish to have the children show shadows of a number of things, for example, one hand, two hands, one to five fingers.

SOCIAL STUDIES ACTIVITIES

This theme provides a setting for introducing the drawing of maps to the children. The results will not be perfect because young children draw things the way they see them.

1. Where I Live

Discuss with the children where they live. Encourage the use of street names and types of housing: apartment, split-level house, row house, farm house. Have the children illustrate where they live. Keep the instructions open in order to get a variety of interpretations. Some children may draw a cross section of the interior of their home, some may draw just an outline of the house, and some may draw their home as it relates to the community.

2. Where My Friend Lives

Continue the previous discussion by having the children relate where they live to where their friends live. Complete this discussion with open instructions to draw a map including where the child lives and where her/his friend lives. Some children will include a lot of detail, whereas others will include only the minimum. This is an appropriate time to introduce and explain the word *map*.

3. Where I Play

Play is a major part of a child's experience at this age. Discuss with the children what they do when they play and what their favorite places for play are. Answers may include various parts of the house, the backyard, a park, a tree, the playground, or a vacant lot. Again, conclude by having the children draw a map to show where they play in relation to where they live.

4. Where I Buy Things

Children of this age are becoming aware of the concept of money and of their place in society as consumers. Discuss with the children whether they buy things themselves or with an adult and, if so, where they buy them. Answers will vary from a corner store or a nearby plaza to the nearest village. Have the children show the location of the store in relation to their home.

5. A Treasure Hunt

Ask each child to hide something that belongs to her/him in the classroom. Have each child draw a map that shows where the object is hidden. Ask each child to exchange maps with a friend and use the friend's map to find the hidden object.

ART ACTIVITIES

1. Paper-Bag Puppets

Paper bags make simple but delightful hand puppets. Leave the bag folded flat so that the fold in the bottom makes a natural "mouth" when the hand is inserted. Each child may draw features with crayons or cut colored paper to turn her/his puppet into a "me".

2. A "Me" Mural

Display the "me's" in your class by making a large mural in your classroom or in the hall by your classroom door. Using kraft or mural paper, have each child lie on the paper while another child draws her/his outline. Have each child cut out her/his "me" and use paint or crayons to make it look like herself/himself.

3. I Am Unique

Ask the children to close their eyes and think of big, fluffy snowflakes floating down from the sky. Tell them it is believed that each snowflake is different from every other snowflake. Tell the children that each person is different from every other person; for example, no one has fingerprints exactly like those of any other person.

Have each child spread a thin coat of washable ink or paint over the ball of one thumb. Give each child a piece of paper about 10 cm square. Have the children press their painted thumbs onto the centre of their paper to make well-defined thumb prints. Have the children print their names below their thumb prints. Make a display of the thumb prints of the children in the class.

MOVEMENT ACTIVITIES

Encourage the children to explore how their bodies move and to discover what they can do through physical movement. Have the children engage in some of the following activities.

1. Balancing

- Balance yourself on one part of your body.
- Balance yourself on two (three, four, five) parts of your body.
- Balance on your knees and one other part of your body.
- Balance without using your hands or your feet.

2. Moving

- Move on three parts of your body.
- Move on only one part of your body.
- Move on four parts of your body without using your feet.
- Move in a fast way.

3. Stretching and Curling

- Stretch to be as tall as you can be.
- Stretch to be as wide as you can be.
- Curl up as small as you can be.
- Curl into a small shape and then stretch into a long shape.

4. No Hands

Tell the children that they may have two minutes to demonstrate a physical activity, such as hopping, in the classroom. They may use any part of their body except their hands. If any action involves the use of one hand, one point is scored against that player; two points are scored against any movement of the two hands. When three points are scored against one player, he/she must withdraw from the demonstration.

MUSIC ACTIVITIES

1. Music by Me

Have the children demonstrate various sounds that can be made with parts of the body, for example, clapping with hands, stamping with feet, snapping with fingers, slapping the knees, clicking the tongue.

Develop rhythm patterns using these sounds in combinations. Vary the number of sounds and the tempo.

2. Songs About Me

Using one of the rhythm patterns from the preceding activity, develop a set of lyrics that fit the pattern. Topics such as "Things I Can Do", "Games I Like to Play", or "Ways I Feel" will provide simple lines for a song.

LESSON OUTCOME

Recognize a set of one; recognize the numeral 1 and the word *one*

Materials

a box containing small objects for showing *one*

Vocabulary

one

RELATED ACTIVITIES

- Have the children look around the classroom as you ask them questions that will require the use of the word *one*; for example, "How many desks do you have?" "How many coat hooks do you have?"
- From catalogues and magazines, have the children cut pictures that represent *one* to them. Have them paste the pictures on sheets of paper. You may wish to have the children use the sheets later for making number booklets.
- You may wish to have the children draw and color pictures to represent *one*, for example, one ball, one cookie, one tree, one house.



Introduction to one

(seventeen) 17

LESSON ACTIVITY

Before Using the Page

• The theme of this unit is *me*. To the child the word *me* is associated with the word *one*. Hence *one* becomes a very personal number and is rarely the same for all children: one child may have one brother or one sister, but another child may have two or three brothers or sisters. Only certain objects represent *one* to everyone, for example, one nose, one head. Relating the concept *one* to each child and to her/his possessions has strong appeal.

Ask children to tell about their families, their friends, their pets, their toys, and so on. Whenever a single item is mentioned, restate the information using the word *one*. For example, Sue may say, "I have a sister Jane and a brother Glen." Restate this by saying, "Sue has *one* sister named Jane and *one* brother named Glen." Have children make other statements.

• Have children demonstrate their understanding of *one* by raising one hand, one foot, one finger, and by pointing to one eye or one ear.

- Ask each child to choose one object from a box of different objects. Call upon each child in turn to hold up the object chosen for the others to see and identify it using the word *one*. Encourage responses in the form "I have one toy car."

Using the Page

- Read the words at the top of the page with the children. Ask children to point to the numeral 1 and then to the word *one*. Ask how many children there are in the swimming pool.
- For objects in the picture of the house, have children complete the statement, "I see one ____." For example, they may say, "I see one cat," or "I see one dog."
- Some of the things shown in the picture of the house are probably found in each child's home. Encourage children to tell about things they have at home. Emphasize the word *one* whenever they mention something of which they have only one. If you wish, have the children mark the things in the picture of which they have only one.

LESSON OUTCOME

Print the numeral 1; record the number of a set having one member

Materials

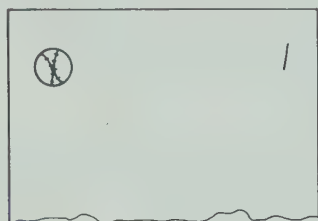
small objects, scissors, paste, a strip for printing 1 from copies of page T335 for each child, number tray

Vocabulary

dot, arrow, trace, print, how many

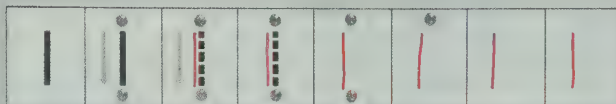
RELATED ACTIVITIES

- From catalogues or magazines, have each child cut a picture of one object and paste it near the top of a large sheet of paper. (Room should be left for the numeral 0, which will be included later.) Have the children print the numeral 1 at the right side of the sheet as shown.

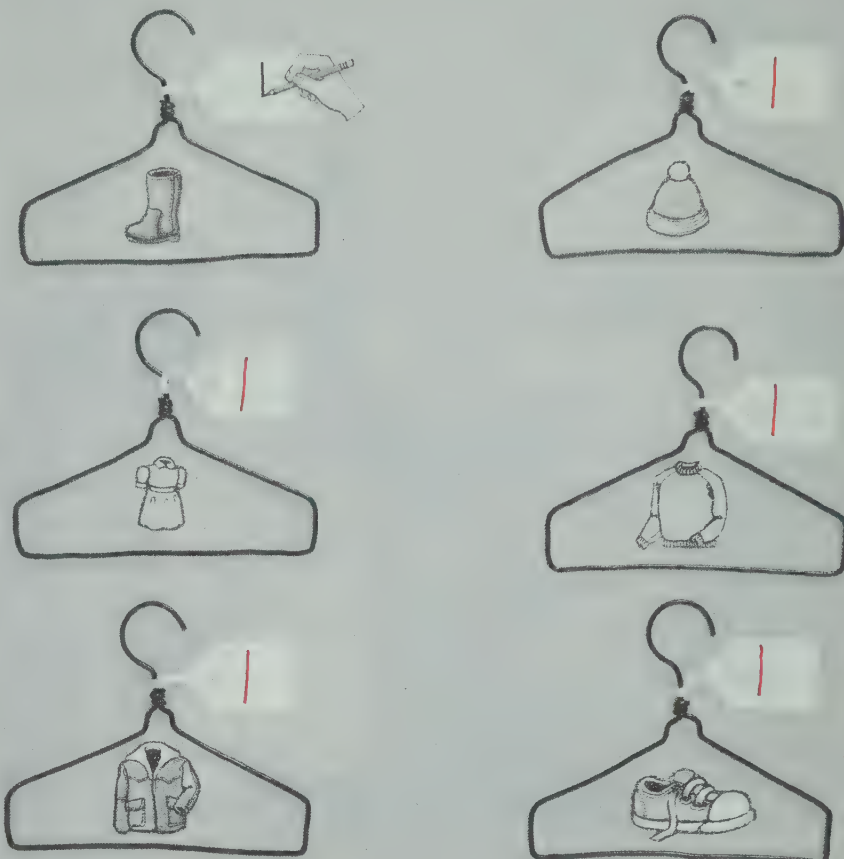


- Make a number tray for *one* as described in the overview on page T24.

Print.



How many ?



Print 1 on the tag for each set of one.

18 (eighteen)

Printing the numeral 1; identifying sets of one

LESSON ACTIVITY

Before Using the Page

- After the children show some understanding of sets of one, they should be ready to print the numeral 1 to represent the number. Helpful clues have been given for printing the numerals; it is hoped that they will remind the children of the proper way to proceed.

Print 1 on the chalkboard. Use colored chalk to mark the green and the red dots and the yellow arrow as shown on page 18. While the children watch, begin at the green (go) dot, follow in the direction of the yellow arrow, and stop at the red (stop) dot. Then have the children use hand and arm movements to form a 1 in the air. Have children print 1 on the chalkboard.

Using the Page

- Direct the children's attention to the word "Print" at the top of the page. Discuss the green, yellow, and red "signals" with the children. Have the children first trace the numeral with one finger. Next have them use their pencils to trace over the two

broken 1's and then have them practise on their own to complete the row. Caution them not to print 1 on the tag at the end of the row because they must place their best 1 there. (See page T24 of the overview.) Then give each child a strip for printing 1 from copies of page T335. Observe the children as they work to determine whether each child is printing 1 correctly. The numerals printed by some children will resemble 1's, but they may have started at the bottom of the numeral. When the children finish practising, have them print or paste their best 1 on the tag.

- For the second part of the page, point to and read the words "How many?" to the children. Have the children identify the number of objects in each set and print the numeral 1 on each tag. Using one or two examples, demonstrate on the chalkboard how the children are to print 1 on the tag for each set of one. When the children have completed the page, point to each set in turn and ask a child to describe it; for example, "The set has one boot."

OBJECTIVE

Demonstrate an understanding of one

Materials

small objects, flash card for *one*, special dice or condition cards for the game (See page T51.), an index card for each child

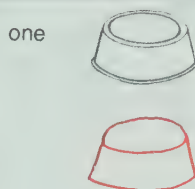
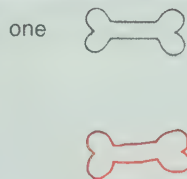
RELATED ACTIVITIES

- Print the word *one* on a strip of paper for each child. Have the children paste the word beside the numeral 1 on their number charts suggested in *Related Activities* on page T30.
- Give each child an index card. Have the children make a number concept card for *one* by drawing one large dot on one side and printing the numeral 1 on the other side. The card will be the first in a sequence of number concept cards that the children will use in future activities. An envelope may be pasted inside the back cover of each child's book for storing the cards.



- You may wish to reinforce the concept of one and, at the same time, review the words *thick* and *thin*. Ask the children to draw one thick bone and then one thin bone.

Draw.



Draw.

Put a tail on each dog.



Play the game.



Reinforcement of one

(nineteen) 19

LESSON ACTIVITY

Before Using the Page

- Review sets of one by having children, in turn, place a set of one on the table and say, for example, "I placed one apple on the table."
- Review printing the numeral 1 by having children use hand and arm movements to form 1 in the air.
- Print the word *one* on the chalkboard while the children watch. Then print *one* on a strip of paper or a label and paste it on the number tray suggested on page T30. Emphasize that the numeral 1 and the word *one* both refer to one object.
- Show a flash card with the word *one* at this time and use it several times during the day to strengthen recognition of the word.

Using the Page

- Direct the children's attention to the word "Draw" at the top of the page. Have the children draw one bone and one dish.
- For the second part of the page, note that the word "Draw" appears again. Have the children draw one tail on each dog.

- Read the words "Play the game" to the children. For the game, "Tail on the Dog", refer to page T51 where two methods are described for playing this game and several similar games that follow. If you use Method 1 for the game on this page, have the children play in groups of two and mark the special dice with 1, one, NO, 1, •, NO. Method 2 describes the use of condition cards in a teacher-directed game. Each condition satisfied permits the child to draw a tail on one dog.

LESSON OUTCOME

Recognize a set of two; recognize and print the numeral 2; recognize the word *two*

Materials

display board and cutouts, a sheet of paper marked for each child to practise the curve for 2, a strip for printing 2 from copies of page T335 for each child

Vocabulary

one more, two

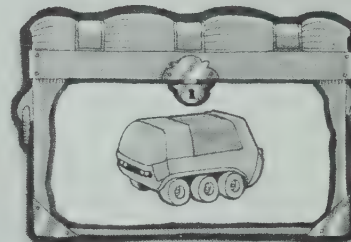
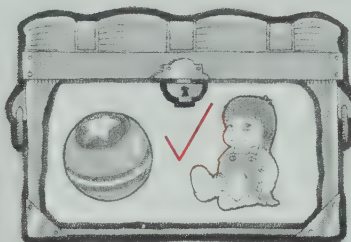
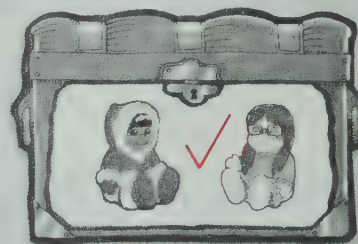
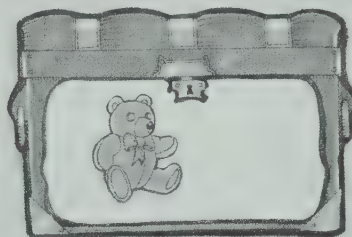
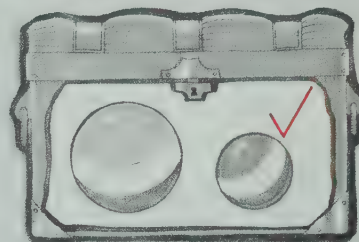
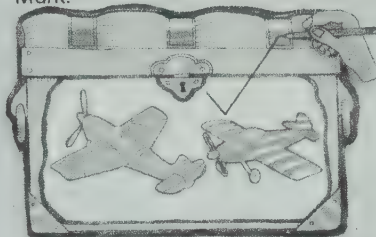
RELATED ACTIVITIES

- Reinforce the concept of two by having each child engage in activities with a partner in the classroom, hall, gym, or schoolyard.
- Read the poem on page T51 to the children and have them do actions suggested by the words.
- Ask the children to suggest things that come in twos, for example, eyes, arms, wheels on a bicycle, handles on a skipping rope, shoes.
- From catalogues or magazines, have each child cut a picture of two objects and paste it below the single object on their number charts. Have the children print 2 beside the set of two.

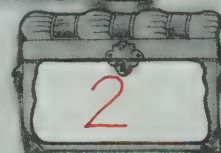
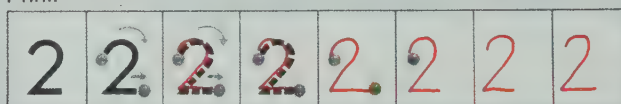
Here I am again.
Look, here comes my friend.
Now there are two of us.

2 two

Mark.



Print.



Use a ✓ to show sets of two.

20 (twenty)

Introduction to one-and-one-more, two; printing the numeral 2

LESSON ACTIVITY

Before Using the Page

- Place cutouts on the display board to illustrate the concept of one-and-one-more and introduce the word *two*. Ask, "How many are one and one more?" Have the children reply, "One and one more are two." This will prepare them for addition and the sequence of the counting numbers. Display several sets of two for children to describe.
- After the children are able to recognize sets of two, they should be ready to print the numeral 2. Because many children have difficulty printing 2, you may wish to have them first use hand and arm movements to form the curve of 2 in the air. Check that each child is moving her/his arm in the proper direction.
- Give each child a sheet of paper marked as shown. Have the children make only the curve for 2 by beginning at the dot, following the dashes, and stopping at the star. Have them do this many times. Once they have developed confidence in this step, printing 2 should be easy for them.



Using the Page

- Have the children interpret the picture and read the words with them. Ask children to point to the numeral 2 and then to the word *two*.
- Point out the word "Mark" above the first trunk. Have the children use a ✓ to identify those sets that have exactly two toys. Emphasize the fact that a ✓ should not be placed on every trunk.
- Review the green, yellow, and red "signals" with the children. Have the children first trace the numeral with one finger. Next have them use their pencils to trace over the two broken 2's and then have them practise on their own to complete the row. Give each child a strip for printing 2 from copies of page T335. When the children finish practising, ask them to print or paste their best 2 on the trunk.

How many?

LESSON OUTCOME

Record the number of a set having one or two members

Materials

small objects, number tray, flash card for *two*, an index card for each child

RELATED ACTIVITIES

- Print the word *two* on a strip of paper for each child. Have the children paste the word beside the numeral 2 on their number charts suggested in *Related Activities* on page T30.
- Give each child an index card. Have the children make a number concept card for *two* by drawing two large dots on one side and printing the numeral 2 on the other side.



Print the correct numeral for each set.

Identifying sets of one and two

(twenty-one) 21

LESSON ACTIVITY

Before Using the Page

- Review the idea that one and one more are two. Display a set of two objects and ask how many there are. The children should be able to recognize the number of the set without counting. The more readily they can do this, the less difficulty they will have later when they are learning to add and subtract.
- Draw sets with one object in each on the chalkboard. Have children draw one more object in each set to make sets of two objects. Have the children print 2 beside each set.
- Ask the children to find sets of two in the classroom.
- Make a number tray for *two* in the same way as for *one*. Print the word *two* on the chalkboard while the children watch. Then print *two* on a strip of paper or a label and paste it on the end of the number tray. Emphasize that the numeral 2 and the word *two* both refer to a set of two objects.
- Show a flash card with the word *two* and use it several times during the day to strengthen recognition of the word. There will be an opportunity for the children to read the word on page 22.

Using the Page

- Direct the children's attention to the words "How many?" and ask a child to describe what is required. Have the children identify the number of beads on each hat and then print the corresponding numeral.
 - After the children have completed the page, you may wish to ask how many hats show two red beads, how many hats show two blue beads, how many hats show one green bead, how many hats show only one red bead, and how many hats show two purple beads.
- Try to make as much use of each page as possible by asking questions to reinforce concepts learned earlier. For example, to reinforce the concepts *more than* and *fewer than* and *one-to-one matching*, ask the children to determine whether there are more red beads or more green beads on the hats. Then ask if there are fewer green beads or fewer blue beads.

OBJECTIVE

Demonstrate an understanding of two

Materials

objects for reviewing *large* and *small*, attribute blocks, crayons for each child, special dice or condition cards for the game (See page T51.)

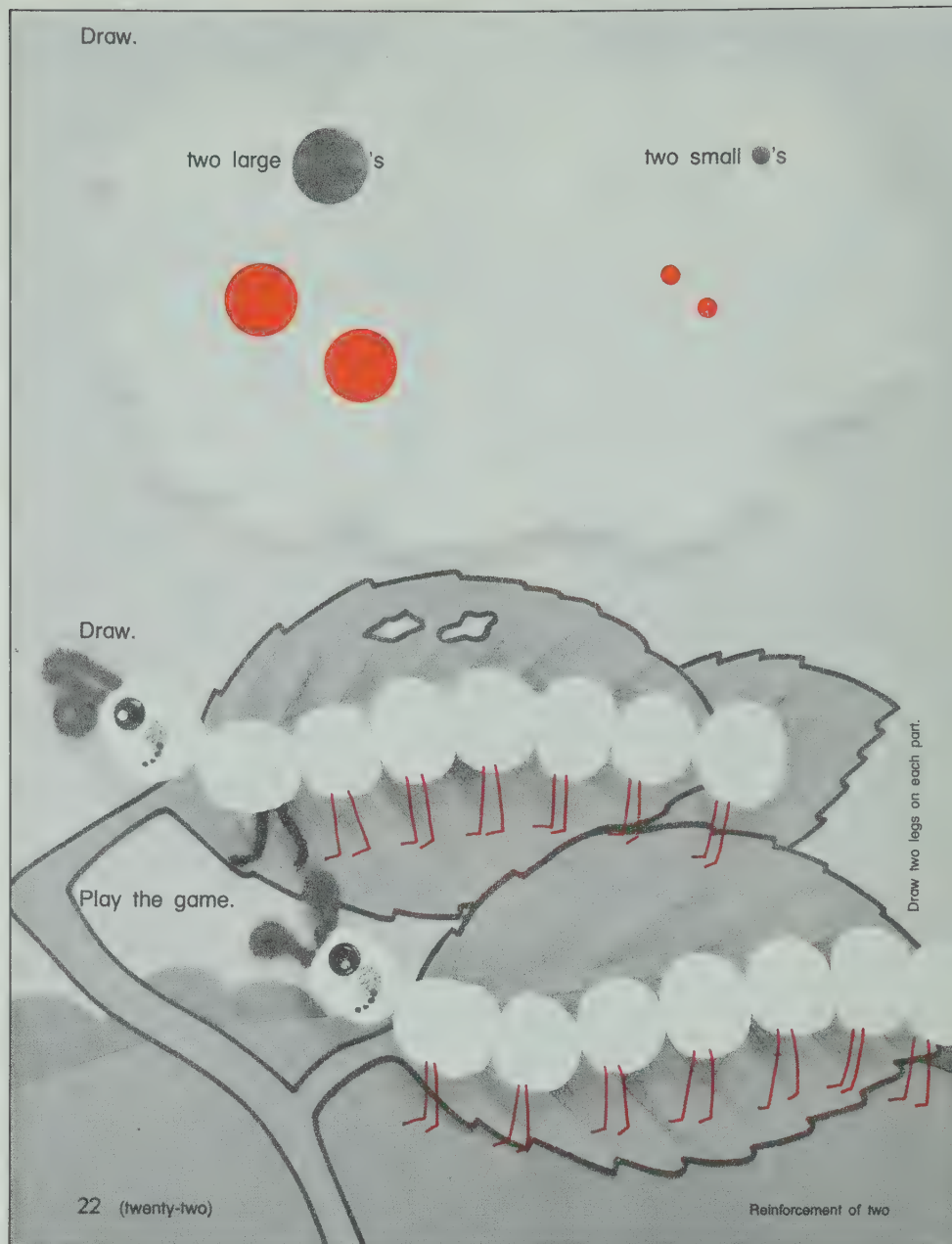
Vocabulary

opposite, pair (optional)

RELATED ACTIVITIES

- You may wish to introduce the word *pair*. Have the children cut pictures from magazines or draw pictures of things that come in pairs, such as boots, shoes, gloves. Display the pictures on a chart.
- Read the poem on page T51 about the boats. Have the children sit in pairs on the floor facing each other and holding hands. As you read, ask the children to rock gently and hum softly during the first couplet. Ask them to make the sound of the wind during the second couplet, rock violently and moan loudly during the third couplet, and rock gently and hum softly during the fourth couplet.

When the children return to their desks, let them draw a picture of the two boats on the sea, if they wish, to reinforce the concept of two.



LESSON ACTIVITY

Before Using the Page

- Review the concepts *large* and *small*. Ask the children to name things in the classroom that they consider as being large and others they consider as being small.
- Display sets with two objects in each; for example, one set might have a bean and a ball. Have children tell how many objects there are in the set, which object is small, and which object is large. You may wish to ask the children what we call words like "large" and "small". Introduce the word *opposite* and have the children think of words that are opposites.
- From the attribute blocks, have children select two large red triangular shapes, two small yellow circular shapes, and so on.
- You may wish to ask the children whether a large object is always "heavy". Point out that "large" is not always the same as "heavy". Demonstrate this by having the children examine an inflated balloon and a small ball.

Using the Page

- Read the words with the children. Do they recognize the words *draw* and *two*? Have the children draw two large green circular shapes as large as possible and two small green circular shapes as small as possible on the cloud.
- Introduce the children to Cathy Caterpuff by reading the rhyme on page T51. Ask them if they know what is missing from her body. Putting pairs of legs on Cathy's body will give the children practice in thinking in twos and also prepare them for the game.
- Reinforce the children's understanding of large and small and two by asking the following questions:
 - "How many large green leaves are there?"
 - "How many small green leaves are there?"
 - "How many holes are there in the first large leaf?"
- Use one of the two methods described on page T51 for playing the game. For Method 1, the children play in groups of two and the special dice are marked 2, two, NO, 2, • •, NO. For Method 2, each condition satisfied permits the child to draw two legs on Cathy.

LESSON OUTCOME

Recognize a set of three; recognize and print the numeral 3; recognize the word *three*

Materials

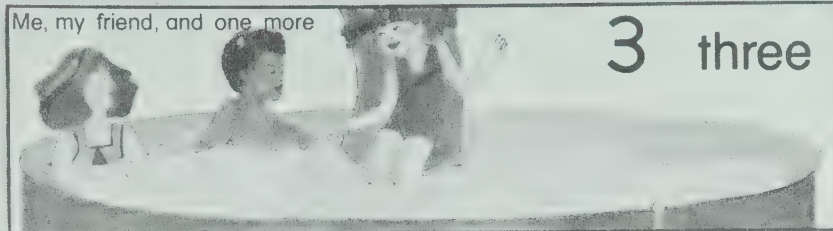
small objects, box, display board and cutouts, a sheet of paper marked for each child to practise the curves for 3, a strip for printing 3 from copies of page T335 for each child

Vocabulary

three

RELATED ACTIVITIES

- Reinforce the concept of three by having the children engage in activities in groups of three in the classroom, hall, gym, or schoolyard. Activities such as throwing a ball and skipping a rope can be adapted so that three children can participate.
- From catalogues or magazines, have each child cut a picture of three objects and paste it below the two objects on their number charts. Have the children print 3 beside the set of three.
- Read a poem about *three* to the children. The poem *Three Little Kittens* is given on page T51.



Mark.



Use a ✓ to show sets of three.

Print.



Introduction to two-and-one-more, *three*; printing the numeral 3

(twenty-three) 23

LESSON ACTIVITY

Before Using the Page

- Review the idea that one and one more are two. For example, ask a child to stand at the front of the classroom and ask another child to join her/him. Extend this idea to two-and-one-more by asking a third child to join the others, and introduce the word *three*.
- After the initial experiences have a child place one object in a box. Have another child place one more object in the box and say, "One and one more are two." Have another child place one more object in the box and say, "Two and one more are three." Have other children repeat the procedure.
- Place sets of one and two cutouts on the display board and have children place other cutouts to make sets of three.
- Print a 3 on the chalkboard as the children watch. Have them use hand and arm movements to form the numeral in the air.
- Give each child a sheet of paper marked as shown. Have the children begin at the dot, follow the dashes, and stop at the star. Have them do this many times.



Using the Page

- Have the children interpret the picture and read the words with them. Ask children to point to the numeral 3 and then to the word *three*.
- Determine whether any children recognize the word "Mark". Have the children use a ✓ to identify those sets that have exactly three things to eat. Emphasize the fact that a ✓ should not be placed on every lunch box.
- Review the green, yellow, and red "signals" with the children. Have them first trace the numeral with one finger. Next have them use their pencils to trace over the two broken 3's and then have them practise on their own to complete the row. Give each child a strip for printing 3 from copies of page T335. When the children finish practising, ask them to print or paste their best 3 on the lunch box.

LESSON OUTCOME

Record the number of a set having from one to three members

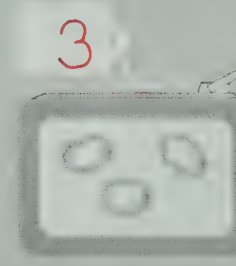
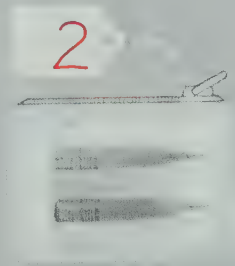
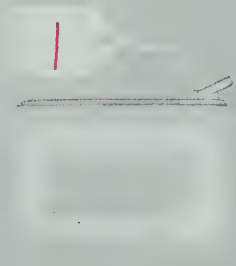
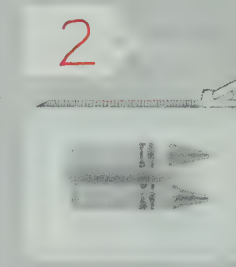
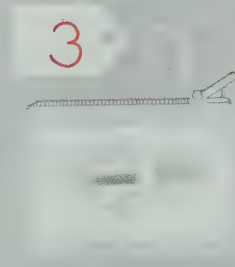
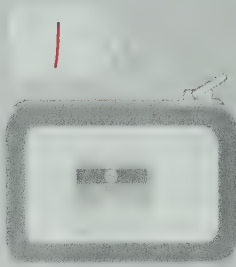
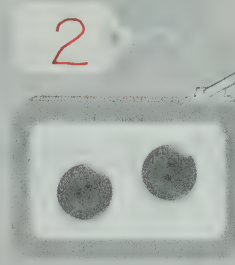
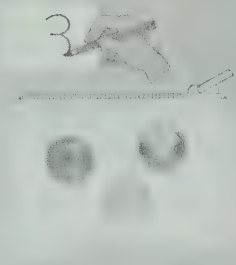
Materials

small objects, number tray, flash card for *three*, an index card for each child

RELATED ACTIVITIES

- Print the word *three* on a strip of paper for each child. Have the children paste the word beside the numeral 3 on their number charts.
- Give each child an index card. Have the children make a number concept card for *three* in the same way as for *one* and *two*.
- If the children need more practice in identifying sets of one, two, and three, you may wish to make a work sheet showing several sets of objects. Draw a frame below each set in which the children can print the numeral 1, 2, or 3. You may prefer to include the numerals and have the children ring the correct one for each set.
- Read the story *Goldilocks and the Three Bears* to the children. Have them draw pictures of the sets of three, for example, the three bears, the three bowls of porridge, the three chairs, and so on.

How many ?



Print the correct numeral for each set.

24 (twenty-four)

Identifying sets of one, two, and three

LESSON ACTIVITY

Before Using the Page

- Place objects in sets of one, two, and three. Ask children to tell how many there are in each set.
- Ask one child to make a set of one or two objects, and then ask another child to include other objects to make a set of three objects. Repeat this procedure several times.
- Make a number tray for *three* in the same way as for *one* and *two*. While the children watch, print the word *three* on a strip of paper or a label and paste it on the end of the number tray.
- Draw a set of three objects on the chalkboard. Ask how many objects there are in the set. Print 3 beside the set and then the word *three*. Emphasize that the numeral 3 and the word *three* both tell how many objects there are in the set.
- Show a flash card with the word *three* and use it several times during the day to strengthen recognition of the word. There will be an opportunity for the children to read the word on page 25.

Using the Page

- Point to and read the words "How many?" Elicit from the children that they are to show the number of objects for each pencil case by printing the correct numeral on each tag.
- After the children have printed all the numerals, you may wish to reinforce concepts learned earlier by asking questions similar to the following:
 "How many red pencil cases are there?"
 "How many blue pencil cases are there?"
 "How many red crayons are there?"
 "How many blue marbles are there?"
 "Are there more rubber bands or more pencils?"
 "Are there fewer buttons or fewer marbles?"

LESSON OUTCOME

Draw a set having three members;
show number combinations for three


Materials


attribute blocks, crayons for each child

RELATED ACTIVITIES

- Have the children look through catalogues and magazines and cut out, for example, three boys, three girls, and three toys. Have them paste the three sets of three on a chart.
- Play the game "Fox and Rabbit" as described on page T324 to demonstrate that two and one more are three, and that one taken away from three leaves two.

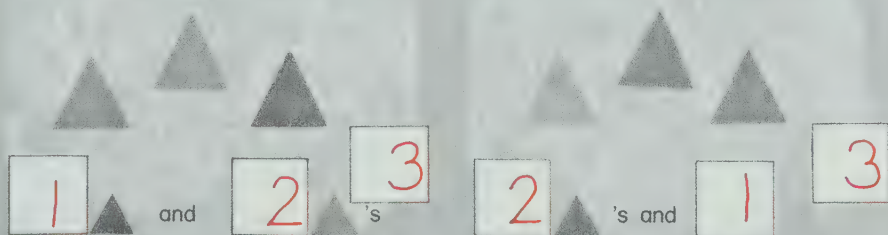
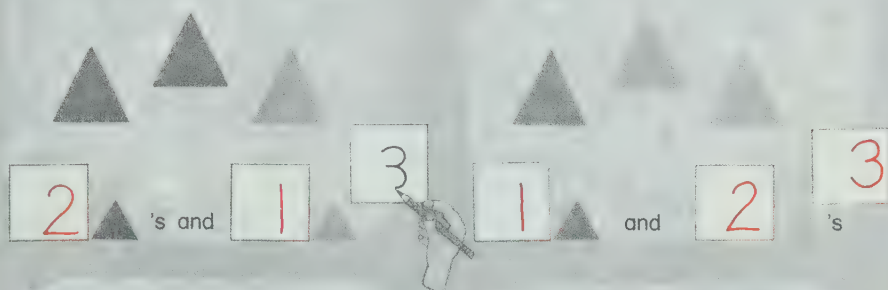
Draw.

three large  's

three large  's



How many ?



Understanding three

(twenty-five) 25

LESSON ACTIVITY

Before Using the Page

- Display two red shapes from the attribute blocks. Ask the children how many red shapes there are. Display one blue shape. Ask how many blue shapes there are. Place the blue shape beside the red shapes and ask how many shapes there are. Have the children say, "Two and one more are three."

Display one red shape and then two blue shapes. Ask questions as before that lead to the statement, "One and two more are three."

Display two blue shapes first and then one red shape. Ask the appropriate questions.

Display one blue shape first and then two red shapes. Ask the appropriate questions.

From the four steps of this activity, the children should become aware that groups of two and one, or groups of one and two, form a set of three.

Using the Page

- Read the words at the top of the page with the children and have them draw the red shapes and the blue shapes.
- For the second part of the page, read the words "How many?" to the children. Have the children show the number of shapes in each set and then the number of red shapes and the number of blue shapes.
- When the children have completed the second part of the page, discuss the different groups that form a set of three. Some children may suggest that there could also be either three red shapes and no blue shapes, or three blue shapes and no red shapes. Make the statement, "Three and no more are three." Then point out that they drew these two possible sets for the first part of the page. Some children may also suggest the use of three colors to show three, for example, one red shape, one blue shape, and one yellow shape. Make the statement, "One and one more and one more are three." Note that this statement suggests the sum of three addends ($1 + 1 + 1 = 3$).

OBJECTIVE

Demonstrate an understanding of three

Materials

small objects, set holders, display board and cutouts, crayons for each child, special dice or condition cards for the game (See page T51.)

Vocabulary

tell

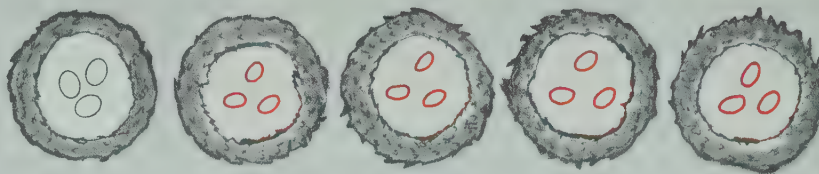
RELATED ACTIVITIES

- If children played the game in groups of three, have each child draw a picture of three objects. Display these pictures side by side as three sets of three.
- Prepare a work sheet showing sets of not more than four objects. Print the numeral 1, 2, or 3 to the left of each set. Have the children color the correct number of objects in each set.

1	○	○	○	○
3	○	○	○	○
2	○	○	○	○
3	○	○	○	○

- You may wish to reinforce the concept of three and introduce the concepts *high* and *low*. Prepare a work sheet showing a tree with several branches, some high and others low. Ask the children to draw three nests on a high branch and three birds on a low branch.

Draw.

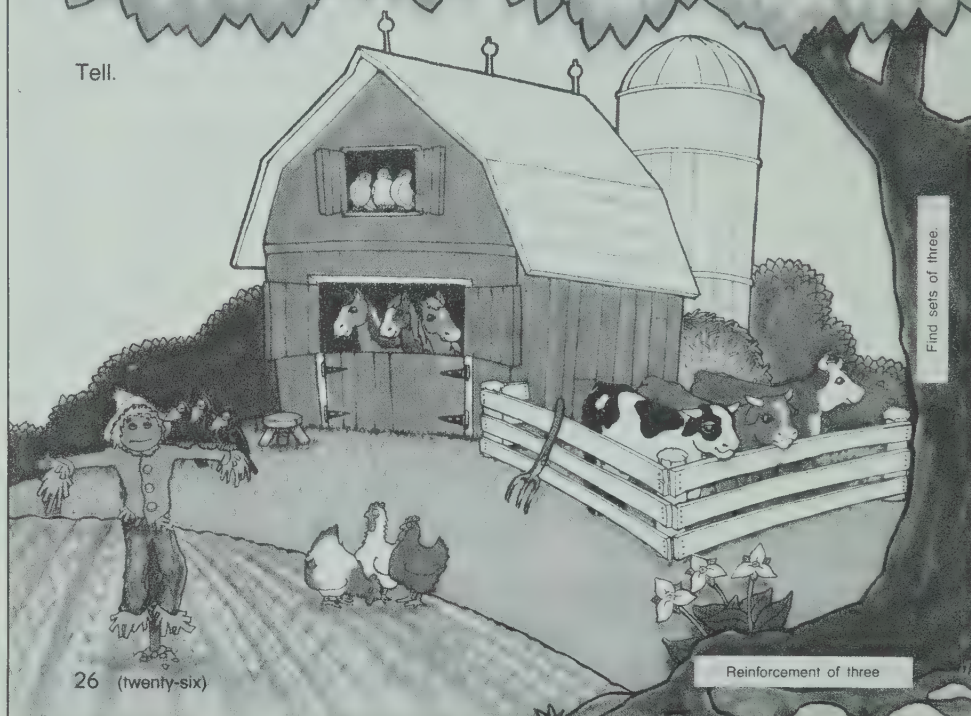


Play the game.



Draw three eggs in each nest.

Tell.



Find sets of three.

26 (twenty-six)

LESSON ACTIVITY

Before Using the Page

- Place several set holders on a table. Ask children to place objects in each set holder to make a set of three. Ask as many children as possible to show a set of three.
- Place one, two, or three cutouts on the display board and ask one child to place a numeral beside the set. If the numeral matches the set, that child can place the next set of cutouts on the display board.

Using the Page

- Have the children draw three eggs in each nest to give them more practice in thinking in threes and to prepare them for the game.

You may wish to direct the children in coloring the eggs so that they will have an informal introduction to the ordinal number concepts *first*, *second*, and *third*.

After the children have drawn the eggs, direct them with instructions similar to the following:

“Use a blue crayon to color the eggs in the first nest.”

“Use a yellow crayon to color the eggs in the second nest.”

“Use a brown crayon to color the eggs in the third nest.”

- Because this is the third time the children meet a game in this unit, some of them may recognize the words “Play the game”. Use one of the two methods described on page T51 for playing the game. For Method 1, have the children play in groups of three so that each child sees herself/himself included in a set of three. Mark the special dice with 3, three, NO, 3, ●●, NO. For Method 2, each condition satisfied permits the child to draw three eggs in one nest.

- Point to the word “Tell” and use the picture at the bottom of the page for discussion. The picture shows many sets of three. Have the children identify these sets. You may wish to have the children ring the sets.

The picture can also be used for reinforcement of the concepts *tall* and *short*. Ask the children to name something that is tall and something that is short; something that is taller than the flowers, shorter than the scarecrow, taller than the cows, and so on.

LESSON OUTCOME

Recognize a set of four; recognize and print the numeral 4; recognize the word *four*

Materials

small objects, display board and cutouts, a strip for printing 4 from copies of page T335 for each child

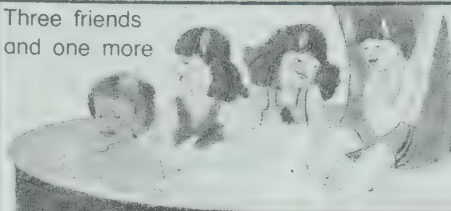
Vocabulary

four

RELATED ACTIVITIES

- Reinforce an understanding of the number *four* by having the children engage in activities in fours in the classroom, hall, or gym.
- From catalogues or magazines, have each child cut a picture of four objects and paste it below the three objects on their number charts. Have the children print 4 beside the set of four.
- Ask the children to turn to page 23. Ask them how many more are needed in each set to make a set of four. You may wish to have them use an X to show sets of two and ring the set that shows only one object.

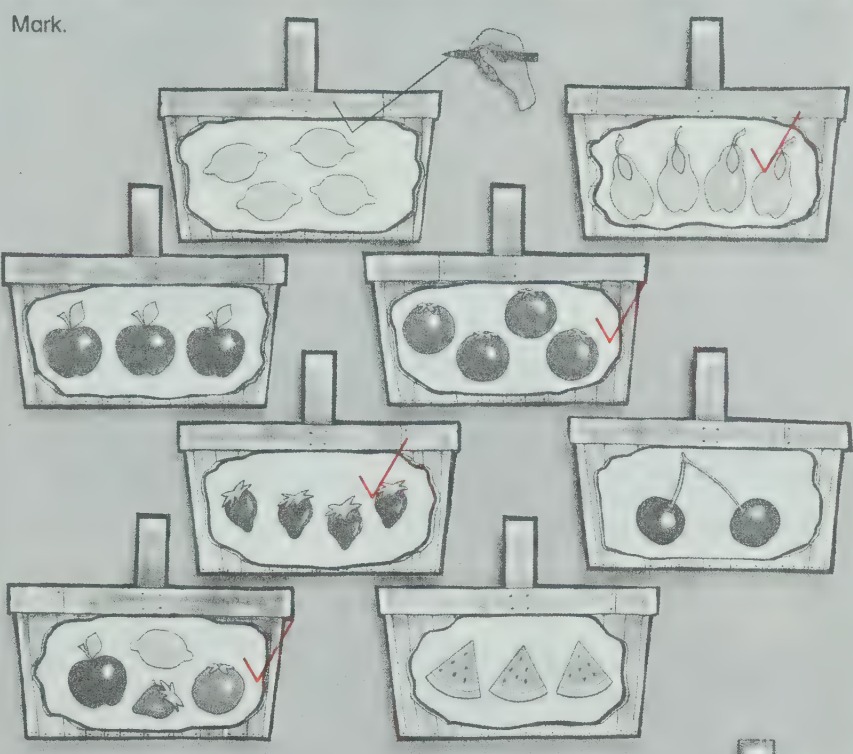
Three friends
and one more




4

four

Mark.



Print.



Introduction to three-and-one-more, four; printing the numeral 4

4

(twenty-seven) 27

LESSON ACTIVITY

Before Using the Page

- Form several groups with three children in each group. Ask children to tell how many there are in each group. Ask another child to join each group. Introduce the word *four* for the number of children in each group.
- Place three objects on a table and ask children how many there are. Place another object on the table and ask how many there are now. Emphasize that a set of four has one more than a set of three, and a set of three has one fewer than a set of four. By rearranging sets of four, lead children to discover that two and two more are four, and one and three more are four.
- Place one cutout on the display board. Ask a child to place other cutouts to make a set of four. Have the child say, "One and three more are four." Place the numeral 4 beside the set. Begin with sets of two and sets of three and ask other children to make sets of four. Have the children make an appropriate statement for each set.
- Print a 4 on the chalkboard as the children watch. Have them

use hand and arm movements to form the numeral in the air. You may wish to print 4's on the chalkboard and include the green, yellow, and red "signals" shown on the page. Have children practise on the chalkboard or on a sheet of paper. Point out that this is the first numeral for which pencils have to be raised from the paper to complete the numeral.

Using the Page

- Have the children interpret the picture at the top of the page and read the words with them. Ask children to point to the numeral 4 and then to the word *four*.
- Elicit from the children that they are to mark only the sets that show exactly four objects.
- Discuss the green, yellow, and red "signals" with the children. Have them first trace the numeral with one finger. Next have them use their pencils to trace over the two broken 4's and then have them practise on their own to complete the row. Give each child a strip for printing 4 from copies of page T335. When the children finish practising, ask them to print or paste their best 4 on the basket.

LESSON OUTCOME

Record the number of a set having from one to four members

Materials

small objects, display board and cutouts, number tray, flash card for *four*, an index card for each child

RELATED ACTIVITIES

- Print the word *four* on a strip of paper for each child. Have the children paste the word beside the numeral 4 on their number charts.
- Give each child an index card. Have the children make a number concept card for *four* in the same way as for *one*, *two*, and *three*.
- Give each child a sheet of paper. Show them how to fold it into four equal parts. Indicate on the chalkboard how many objects, from one to four, they are to draw in each of the four parts.

How many ?

28 (twenty-eight)

Identifying sets of one to four

Print the correct numeral for each set.

LESSON ACTIVITY

Before Using the Page

- Display objects in sets of one, two, three, and four. Ask children to tell how many there are in each set.
- Ask one child to make a set of one, two, or three objects, and then ask another child to change the set into a set of four objects. Repeat the procedure with other children.
- Place four sets with one, two, three, and four cutouts in that order on the display board. Use these to reinforce the idea of *one more*. Ask the children how many there are in the first set, how many more were needed to make the second set than the first set, and so on. You may also wish to discuss the sets in reverse order. Ask how many fewer there are in the third set than there are in the fourth set, and so on.
- Make a number tray for *four* in the same way as for *one*, *two*, and *three*. While the children watch, print the word *four* on a strip of paper or a label and paste it on the end of the number tray. Place the tray in sequence beside the trays for *one*, *two*, and *three*.

- Draw a set of four objects on the chalkboard. Ask how many objects there are in the set. Print 4 beside the set and then the word *four*. Emphasize that the numeral 4 and the word *four* both tell how many objects there are in the set.
- Show a flash card with the word *four* and use it several times during the day to strengthen recognition of the word. There will be an opportunity for the children to read the word on page 29.

Using the Page

- Lead the children to suggest that they are to show the number of objects on each pail by printing the correct numeral in the frame.
- After the children have printed all the numerals, lead a discussion to reinforce and extend concepts learned so far. For example, ask children to find the pail with two flowers. Then ask how many more flowers would be needed for there to be four flowers. Ask them to find the pail with the white shell. Ask how many more shells would be needed for there to be three shells. Also, ask questions involving the concepts *more than* and *fewer than* based on the ability of the children.

Draw.

LESSON OUTCOME

Draw a set having four members; show number combinations for four

Materials

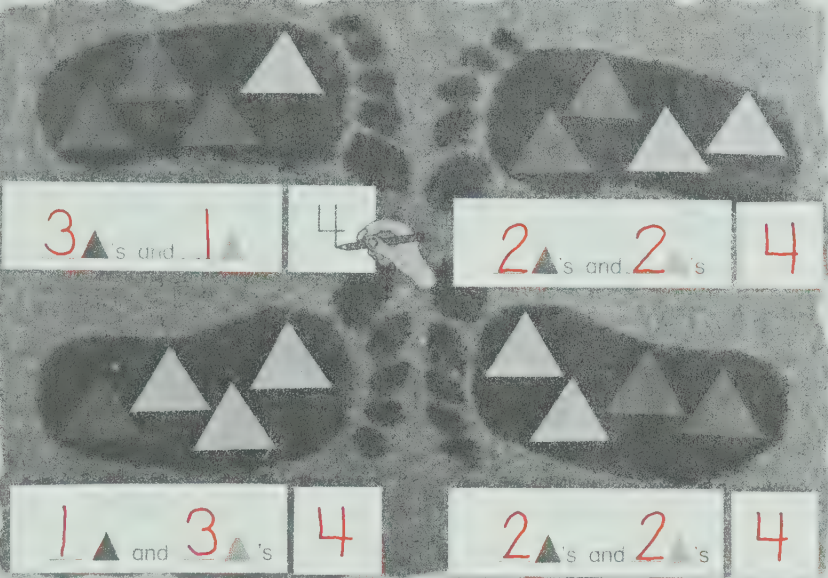
display board and cutouts, crayons for each child

RELATED ACTIVITIES

- Prepare a work sheet as shown. Have the children draw sets having the given numbers of objects.

	1		4
	2		3
3 and 1		2 and 2	

How many?



Understanding four

(twenty-nine) 29

LESSON ACTIVITY

Before Using the Page

- Place several set holders on a table. Ask children to place objects in each set holder to make a set of four. Ask as many children as possible to show a set of four.
- Place four cutouts on the display board, for example, two red square shapes and two yellow square shapes. Ask how many shapes there are, how many red shapes there are, and how many yellow shapes there are. Replace one red shape with a yellow shape. Ask questions as before. Ask how many shapes there are when you take away two shapes from a set of four shapes. Take away two shapes as the children watch. By manipulating the sets of shapes you can begin building toward the concepts of addition and subtraction.

Using the Page

- Read the words at the top of the page with the children and have them draw four large red triangular shapes and four large yellow triangular shapes.

- For the second part of the page, read the words "How many?" Elicit from the children that they are to show the number of triangular shapes in each set and then the number of red triangular shapes and the number of yellow triangular shapes.
- When the children have completed the second part of the page, discuss the different groups that form a set of four. Some children may suggest that there could also be either four red triangular shapes and no yellow triangular shapes, or four yellow triangular shapes and no red triangular shapes. Make the statement, "Four and no more are four." Then point out that they drew these two possible sets for the first part of the page.

OBJECTIVE

Demonstrate an understanding of four

Materials

small objects, set holders, special dice or condition cards for the game (See page T51.)

RELATED ACTIVITIES

- From catalogues or magazines, have the children cut pictures that show sets of four. Have them paste these pictures on a chart for display.
- To reinforce the numbers one, two, three, and four, read the rhyme for this page on page T51. Have the children do the actions and then clap their hands the required number of times.
- Prepare a work sheet showing an array of 12 or 16 empty cones for ice cream. Have special dice marked 1, 2, NO, 3, 4, NO on the six faces. Each child rolls a die and then draws that number of scoops of ice cream in the first cone. The procedure is repeated for each cone in turn. At the end some of the cones may contain no ice cream. Save these sheets for possible discussion of *more than*, *fewer than*, *how many*, and *zero*.

You may wish to adapt this activity for use as a game between two players. The winner will be the player who fills all the cones first. When a player throws "NO", a cone cannot be filled until the next turn.

Draw.

Play the game.

Tell.

30 (thirty)

Reinforcement of Four

Draw four windows in each house.

Find sets of four.

LESSON ACTIVITY

Before Using the Page

- To review the number four have the children group themselves into sets of four. If there are fewer than four children in the last set, ask how many more children are needed to make a set of four.
- Place several set holders on a table. Ask children to place one, two, or three objects in each set holder. Ask other children to place objects in the set holders to change the sets into sets of four.

Using the Page

- Have the children draw four windows in each house to give them more practice in thinking in fours and to prepare them for the game. Again, you may use this kind of exercise for the concept of ordinal numbers. Say, for example, "Put four windows in the second house." "Put four windows in the house that is orange. Which house is that?"

- If possible, have a child read the words "Play the game" above the two rows of houses. Use one of the two methods described on page T51 for playing the game. For Method 1, have the children play in groups of four to reinforce the concept of three-and-one-more. Mark the special dice with 4, four, NO, 4, $\bullet \bullet$, NO. For Method 2, each condition satisfied permits the children to draw four windows in one house.
- Direct the children's attention to the word "Tell" and use the picture at the bottom of the page for discussion. The picture shows many sets of four. Have the children identify these sets. You may wish to have the children ring the sets.

Ask questions about what is shown in the picture to reinforce concepts that the children have already experienced; for example, "Are there more people in the white bus or in the yellow car?" "How many more children could play on the swings?" "Is the number of big trees the same as the number of small trees?"

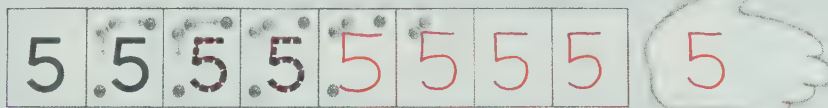
Four and one more are five.

5 five

Mark.



Print.



Introduction to four-and-one-more, five; printing the numeral 5

(thirty-one) 31

LESSON OUTCOME

Recognize a set of five; recognize and print the numeral 5; recognize the word *five*

Materials

small objects and set holders, display board and cutouts, a sheet of paper marked for each child to practise the curve for 5, a strip for printing 5 from copies of page T335 for each child

Vocabulary

five

RELATED ACTIVITIES

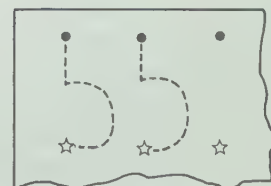
- Have each child cut a picture from a magazine or draw a picture of five objects and paste it below the four objects on their number charts. Have them print 5 beside the set of five.
- The children may enjoy playing dominoes using only those that show from one to five dots. Refer to page T324 for a description of how the domino pieces may be used to form a "Domino Train".

LESSON ACTIVITY

Before Using the Page

- Place four objects in turn on a table and as each is placed, ask children how many there are. Place another object in the set and introduce the word *five*. Emphasize that a set of five has one more than a set of four. Repeat by making other sets of four objects into sets of five.
- Place one cutout on the display board and ask how many there are. Place another cutout and repeat the question. Emphasize the one-more pattern. Have the children make a statement each time; for example, "One and one more are two." Follow the same procedure with three and four cutouts. Add a fifth cutout and ask how many there are. Repeat several times.
- Draw a set of five objects on the chalkboard. Ask how many objects there are in the set. Print the numeral 5 beside it. Follow the green dot, yellow arrows, and red dot sequence shown on page 31. Emphasize that the horizontal bar at the top is made last. Have the children use hand and arm movements to form 5's in the air.

- Give each child a sheet of paper marked as shown. Have the children begin at the dot, follow the dashes, and stop at the star.



Using the Page

- Have the children interpret the picture at the top of the page and read the words with them. Ask children to point to the numeral 5 and then to the word *five*.
- For the second part of the page, ask the children to mark each hand that has five objects.
- Have the children trace over the two broken 5's and then practise on their own to complete the row. Give each child a strip for printing 5 from copies of page T335. When the children finish practising, ask them to print or paste their best 5 on the hand.
- After the children have completed the page, you may wish to ask them how many more objects are needed for there to be five objects in a particular set.

LESSON OUTCOME

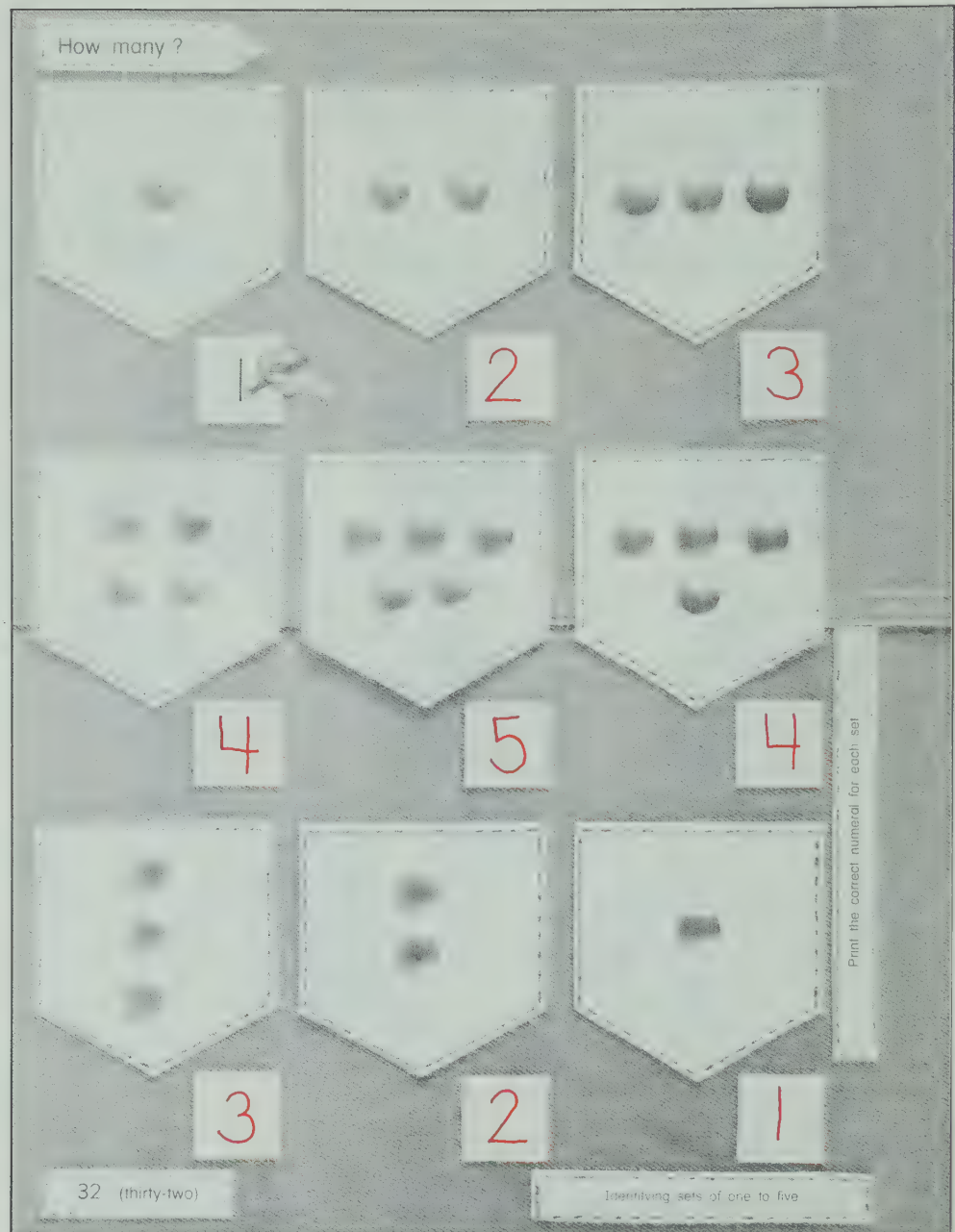
Record the number of a set having from one to five members

Materials

number tray, flash card for *five*, an index card for each child

RELATED ACTIVITIES

- Print the word *five* on a strip of paper for each child. Have the children paste the word beside the numeral 5 on their number charts.
- Give each child an index card. Have the children make a number concept card for *five* in the same way as for *one*, *two*, *three*, and *four*.
- Use flash cards for the words *one* to *five*. Display a card and have the children respond by holding up the corresponding number concept card. You may wish to have the children show the dot pattern for several rounds, and then show the numeral side of their cards for the remaining rounds.
- Direct the children in the matching activity described on page T324.



LESSON ACTIVITY

Before Using the Page

- Draw a set of five objects on the chalkboard. Ask how many objects there are in the set. Print 5 beside the set and then the word *five*. Emphasize that the numeral 5 and the word *five* both tell how many objects there are in the set.
- Make a number tray for *five* in the same way as for *one*, *two*, *three*, and *four*. While the children watch, print the word *five* on a strip of paper or a label and paste it on the end of the number tray.
- Show a flash card with the word *five* and use it several times during the day to strengthen recognition of the word. There will be a chance for the children to read the word on page 33.

Using the Page

- If possible, have children read the words "How many?" and describe in their own words that they are to record the number of studs on each pocket. When the children have completed the page, have them point to each pocket in turn and say the

corresponding number. Lead them to observe that the numbers are in sequence, both increasing and decreasing. Have them repeat the numbers in order from one to five and then from five to one. You may wish to have the children say the words *one* to *five* for the notes *do*, *re*, *mi*, *fa*, *sol*, and then reverse the sequence, starting at *sol* for five.

LESSON OUTCOME

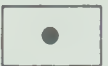
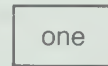
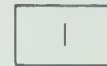
- Draw a set having five members; show number combinations for five

Materials

attribute blocks, display board and cutouts, crayons for each child

RELATED ACTIVITIES

- Have the children play the following game. You will need two sets of 15 cards. In each set there will be three cards showing the three ways of representing each of the numbers from one to five.



The cards are shuffled and arranged face down in an array. Two cards are turned over. If the two cards represent the same number they are removed; if they do not represent the same number, they are placed face down in their original positions.

One child may play alone, continuing until all the cards are collected. Several children may play, taking turns turning over a pair of cards. If the two cards represent the same number, the player keeps the cards and takes another turn. If the cards do not represent the same number, the next player takes a turn. The player with the most pairs at the end of the game is the winner.

LESSON ACTIVITY

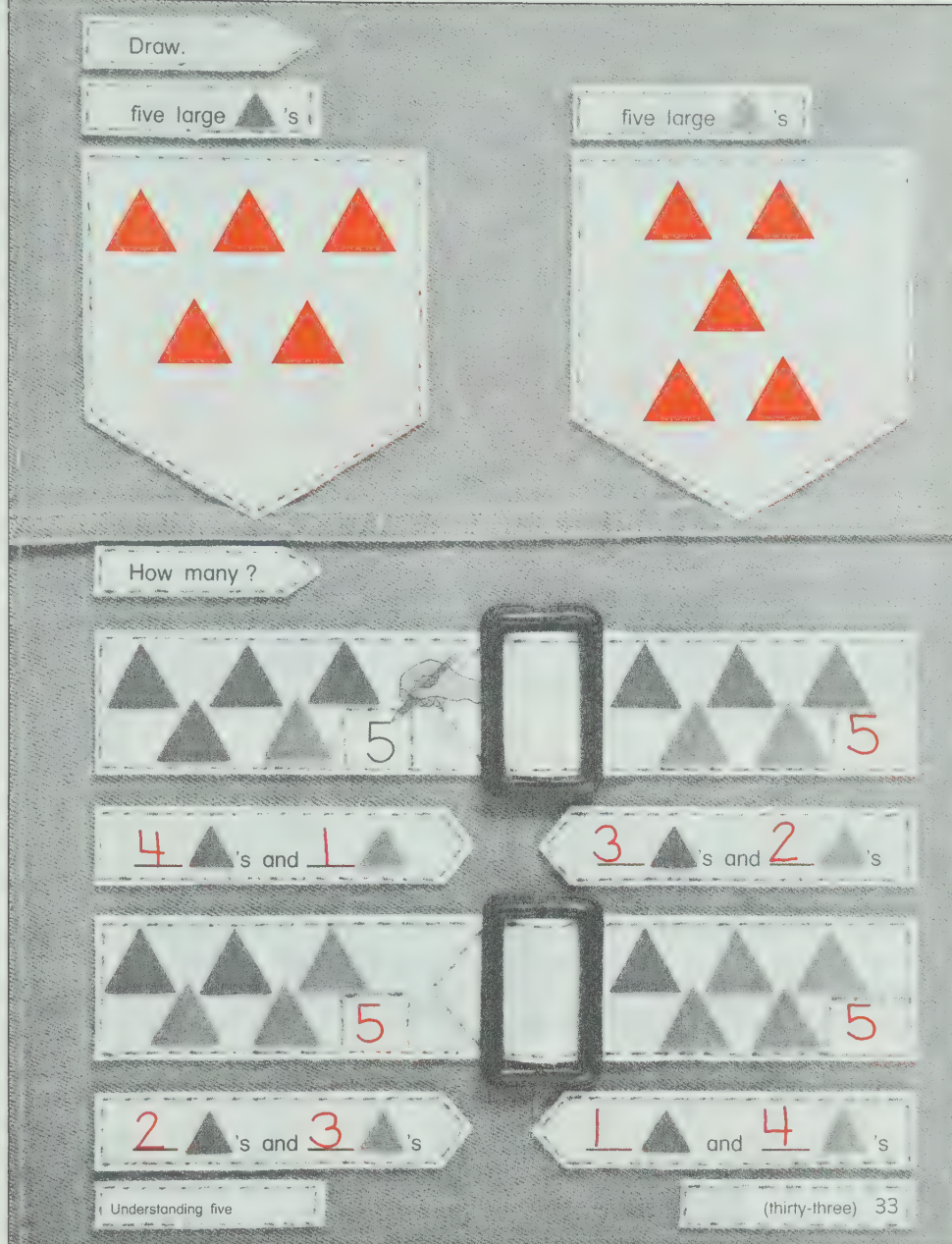
Before Using the Page

- Using attribute blocks, make a set of four red shapes and one blue shape. Ask the children how many shapes there are, how many red shapes there are, and how many blue shapes there are. Repeat using five other shapes, for example, three red shapes and two blue shapes. Ask similar questions to help the children see the various combinations that make a set of five.
- Place four cutouts on the display board. Ask one child to place one cutout to make a set of five. Have the children say, "Four and one more are five." Repeat the procedure, starting with one, two, and three cutouts. Each time have children state how many more cutouts are needed to make a set of five.

Using the Page

- Read the words at the top of the page with the children and have them draw the five red triangular shapes and the five blue triangular shapes on the two pockets.

- For the second part of the page, read the words "How many?" to the children. Have the children first record the number of triangular shapes there are in a set. Then have them record the number of red triangular shapes and the number of blue triangular shapes that make up the set.
- After the children have completed the page, discuss with them the different number combinations for five. Some children may suggest that there could also be either five red shapes and no blue shapes, or five blue shapes and no red shapes. Make the statement, "Five and no more are five." Point out that the children drew these two possible sets for the first part of the page.



LESSON OUTCOME

Demonstrate an understanding of five and the ordinal number concepts to *fifth*

Materials

display board and cutouts, flash cards for the words *first*, *second*, *third*, *fourth*, *fifth*, special dice or condition cards for the game (See page T51.)

Vocabulary

first, second, third, fourth, fifth

RELATED ACTIVITIES

- Ask five children to stand in a row. Establish who is first in the row. Ask other children, in turn, to shake hands with the third child, to give a pencil to the second child, to change places with the fourth child, and so on.
 - Play a simple form of “Bingo”.
- Give each child a card divided as shown, and nine markers. The first time the game is played, each child must print the numerals from 1 to 5 at random on the card. Then the leader calls numbers selected by using a special spinner or die. The child who has three markers in a row first is the winner and may become the leader.

1	1	4
4	2	3
5	3	5

1

first

2

second

3

third

4

fourth

5

fifth

Color.

Color each flower.

Draw.

Play the game.

34 (thirty-four)

Understanding the ordinal number concepts to *fifth*

Draw a flower for each stem.

LESSON ACTIVITY

Before Using the Page

- Call five children in turn to come to the front of the classroom and stand in a row facing the door. Discuss with the children who was called up first, who was called up second, and so on. Ask who would be first to go out the door, second to go out the door, and so on. Repeat for other groups of five children, but as the corresponding questions are answered, give the first child a flash card showing the word *first*, the second child a flash card showing the word *second*, and so on.
- On the display board, place a set of five different cutouts in a row. Establish which cutout is first in the row. Then have children tell which cutout is second (third, fourth, fifth) in the row. Also, ask the color of the first (second, third, fourth, fifth) cutout.
- To strengthen recognition of the words *first* to *fifth*, distribute the flash cards to five children and ask them to stand in a row to show their position in the row. Ask the other children if the order shown is correct and to identify who is in each position.

Using the Page

- Discuss with the children the locations and the colors of the flowers in the row at the top of the page. Then have the children color the five flower shapes according to the sequence of colors shown in the first row.
 - For the second part of the page, have the children draw “flowers” on the stems to give them more practice in thinking in fives and to prepare them for the game.
- You may wish to reinforce the ordinal number names to *fifth* by asking the children to put a red flower on the third stem, a blue flower on the first stem, and so on for the last set of stems.
- Use one of the two methods described on page T51 for playing the game. For Method 1, have the children play in groups of five to reinforce the concept of four-and-one-more. Mark the special dice with 5, five, NO, NO, NO, and ●●●. For Method 2, each condition satisfied permits the child to draw five flowers for the five stems.

LESSON OUTCOME

Count the sides and the corners of a geometric shape

Materials

attribute blocks, geoboards, rubber bands, three-by-three arrays of dots from copies of page T331, flash cards for the words *sides* and *corners*, transparent geoboard and overhead projector (optional)

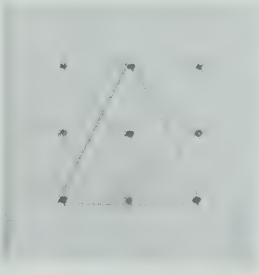
Vocabulary

sides, corners

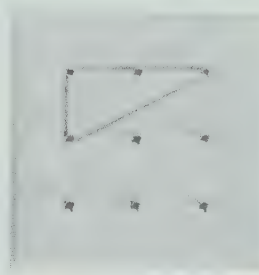
RELATED ACTIVITIES

- Have the children copy the shapes shown on page 35 on geopaper, but in different positions. Challenge children who are capable to find other possible positions for the first triangle, for example.

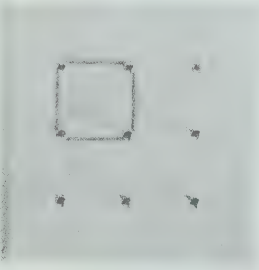
How many ?



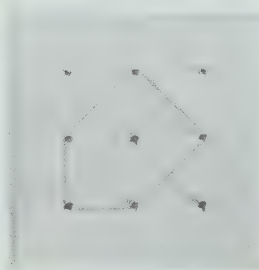
sides 3 corners 3



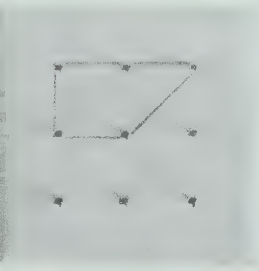
sides 3 corners 3



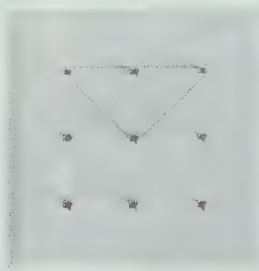
sides 4 corners 4



sides 5 corners 5



sides 4 corners 4



sides 3 corners 3

For each shape, count the sides and the corners.

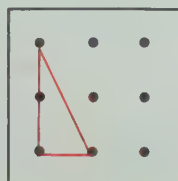
Counting the sides and the corners of a geometric shape

(thirty-five) 35

LESSON ACTIVITY

Before Using the Page

- How you use page 35 will depend on your equipment. (See the comments in *Before Using the Page* on page T13.)
- Display a triangular shape and a square shape from the attribute blocks. Show a flash card for the word *sides*. By asking questions, lead the children to conclude that the triangular shape has three *sides* and the square shape has four sides. Show a flash card for the word *corners*. Bring out the idea that two sides of each shape form a *corner*. Have the children count the corners of the triangular shape and the corners of the square shape.
- Make a drawing on the chalkboard of a geoboard having nine pegs, or use a transparent geoboard on the overhead projector. Use colored chalk to draw a triangle like the one shown. Ask the children what shape you have drawn. Have them count the sides of



the triangle. To reinforce the number concepts to five, have the children count the pegs in the sides of the triangle and the pegs not used to form the triangle.

Draw a square that uses four pegs and ask questions similar to the ones above. Draw other shapes, being careful to always have either four or five pegs as part of the shape. (The number of pegs used is not necessarily meant to determine the number of vertices of the shape.)

Using the Page

- If you have geoboards for all the children in the group, have them copy each shape on the page onto their geoboards and then record the number of sides and the number of corners.
- If you do not have geoboards, you may wish to have the children work directly on the page or you may choose to have them work on three-by-three arrays of dots from copies of page T331.
- After the children have completed the page, reinforce the numbers to five by asking how many pegs are touched by each rubber band and how many pegs are not touched by each rubber band.

LESSON OUTCOME

Classify events as taking place in the morning, afternoon, or evening

Materials

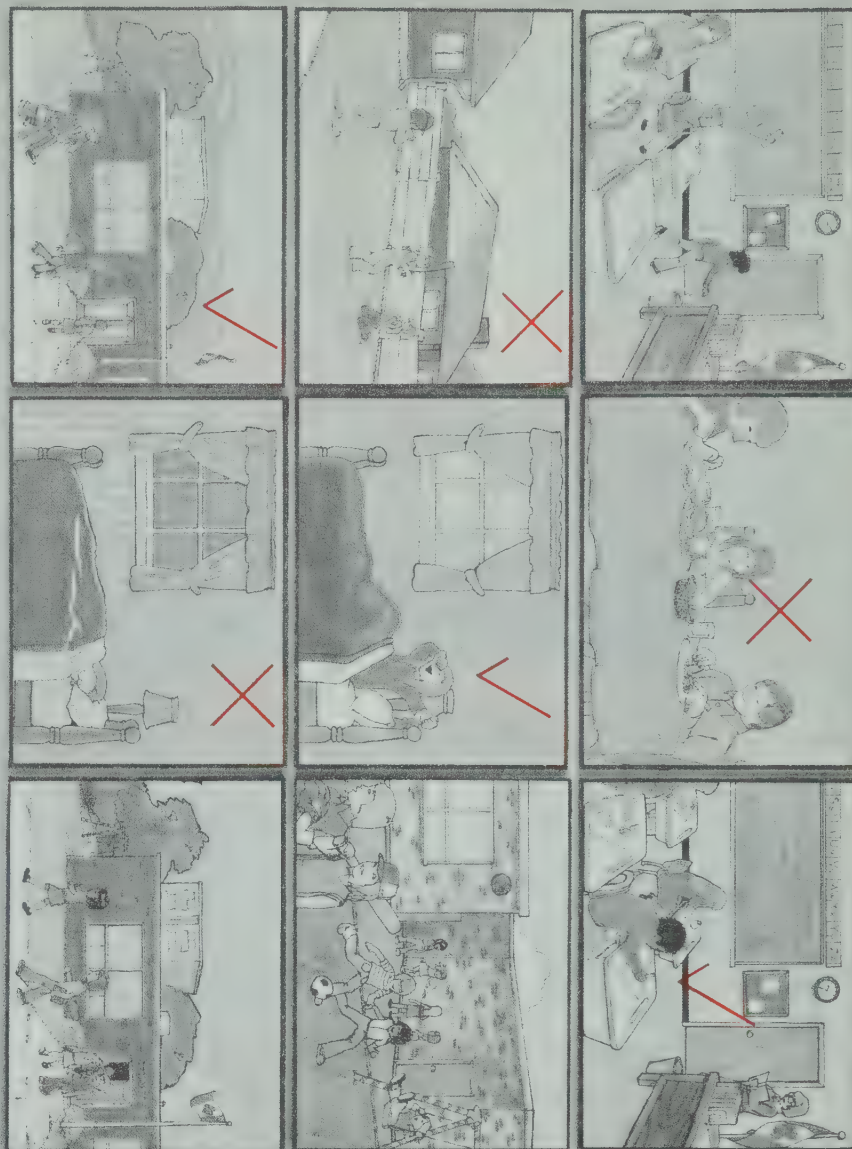
pictures of various activities from magazines

Vocabulary

morning, noon, afternoon, evening

RELATED ACTIVITIES

- Begin to associate times with activities that the children do during the day; for example, "It is 10:30 o'clock – time for recess."
- Discuss "a long time" and "a short time" with the children. Children have only personal knowledge of these phrases and the meanings are personal to each child. Listening to the teacher talk about something they do not understand represents "a long time" to some children; playing an enjoyable game during gym period represents "a short time".



Use a / to show morning activities. Use an X to show evening activities.

36 (thirty-six)

Different parts of the day: morning, afternoon, and evening

LESSON ACTIVITY

Before Using the Page

- Discuss with the children what the different parts of a day are. Explain that morning ends at noon and after that we speak of the *afternoon*. The break between afternoon and evening is not so well-defined, but usually to a child it is indicated by the evening meal. When the children understand *morning*, *afternoon*, and *evening*, discuss what they do first during each part of the day. Start with the morning and when they get up. Build their day with them by asking what they do next, what they do after that, and so on.
- After the discussion, have each child draw a picture of a favorite activity that occurs during the day. Make three charts, the first labelled "Morning", the second labelled "Afternoon", and the third labelled "Evening". Ask the children to describe their activities and then place their pictures on the appropriate charts.
- Display pictures cut from magazines of people or animals involved in various activities. Have the children decide the part

of the day during which each activity takes place. For example, a picture of several persons waiting for a bus may have been taken in the morning or in the evening. Have the children look for clues that might verify the part of the day in which the picture was indeed taken.

Using the Page

- Discuss each picture with the children to make sure that they are interpreting it correctly. Let the children decide on their own in which part of the day each event occurs. Have them use a / to indicate each activity that occurs in the morning. Have them use an X to indicate each activity that occurs in the evening. Have the children consider the pictures that are unmarked as showing afternoon activities.

Match.

penny
1 cent 1¢

Match the price of each item with the correct number of pennies.

Matching pennies with an item costing from 1 to 5 cents

(thirty-seven) 37

LESSON OUTCOME

Recognize a penny; associate pennies with the price of an item from 1 cent to 5 cents

Materials

real money, play money, or coin cutouts from copies of page T337, small objects having tags with prices from 1¢ to 5¢, display board

Vocabulary

penny, cent, ¢, price

RELATED ACTIVITIES

- Help the children set up a store in one part of the classroom. Choose small items and make a tag for each item showing a price from 1¢ to 5¢. Choose one child to be the storekeeper. Have each child choose an item and count out the pennies needed to buy it. Have the storekeeper decide whether the number of pennies is correct. You may wish to let the children play store in their spare time. If possible, see that each child gets a chance to be the storekeeper.

LESSON ACTIVITY

Before Using the Page

- Begin a discussion of what money is and what it is used for. Because children have had opportunities to use money, they will enjoy telling about their experiences.
- Hold up a penny, review the name *penny*, and explain that it is worth *one cent*. Write “penny” and “1 cent” on the chalkboard. Ask the children how many pennies are needed to have 2 cents. Ask a child to display the correct number of pennies. Repeat for 3, 4, and 5 cents.
- Hold up an item with a tag showing 2¢. Ask the children what “2¢” means. Write “2 cents” on the chalkboard and have the children read it. It is not necessary to emphasize the ¢ sign at this time; simply explain that it is a short way of showing the word “cents”. Ask the children to explain prices of 3¢, 4¢, and 5¢.
- Place items having tags with prices from 1¢ to 5¢ on the display board. Have children in turn choose the number of pennies needed to buy each item.

- Place small items having tags with prices from 1¢ to 5¢ on a table. Have children in turn come and “buy” one item by showing the number of pennies needed.
- Draw three different items having tags with prices of 2¢, 3¢, and 4¢ on the chalkboard. Draw five pennies to the right of the items. Have children ring the correct number of pennies needed to buy each item and then state the value of the item.

Using the Page

- Read the words at the top of the page with the children. Ask them to look at the objects shown and their price tags. Ask the children questions similar to the following:
“What can you buy for 2 cents?”
“How many pennies would you have to give for the pencil sharpener?”
“What costs one cent more than the blue truck?”

After the discussion, point out that each row of pennies is not beside the correct price tag. Have the children draw lines to match the number of pennies with the correct price tag of each item.

OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

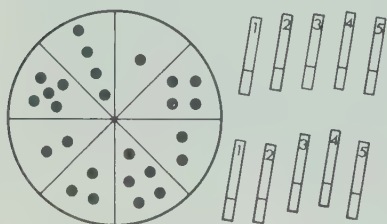
Materials

display board and cutouts

RELATED ACTIVITIES

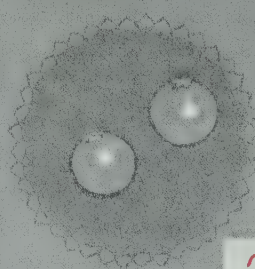
- The following activity will review and reinforce the number concepts *one* to *five*.

Cut a circular shape from cardboard. Divide it into eight parts and mark a set of from one to five dots on each part. You may wish to laminate the surface. Mark the numerals 1 to 5 on clothes pins. Have children fasten a clothes pin to the set with the corresponding number of dots.

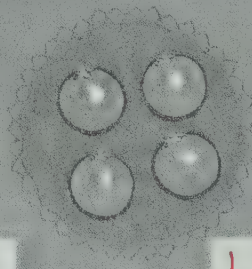


- Play the game "Snap" described on page T324, using the following cards from a standard pack of playing cards: four each of the ace, two, three, four, and five.

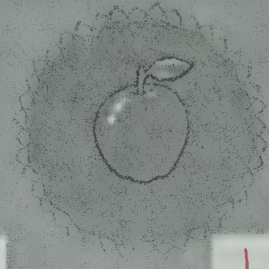
How many ?



2



4



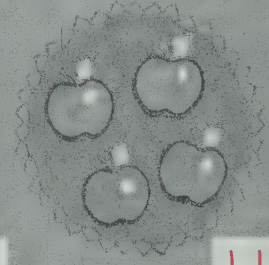
1



5



3

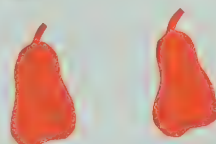


4

Print the correct numeral for each set.

Draw.

two 's



five 's



38 (thirty-eight)

CHECKUP

LESSON ACTIVITY

Before Using the Page

- Review the numbers to five by using these two activities.

1. Bean Bag Race

Group the children in teams of five at one end of the gym. At the other end of the gym, place five bean bags in a pile opposite each team. At a given signal the first child in each team runs to take one bean bag from the pile and runs back to the team. The bean bag is given to the second child who takes it, runs to the pile, and takes one more. The two bean bags are passed to the third child and the race continues. The team that collects the five bean bags first is the winner.

2. Action Poem

Read this poem and have the children do the actions.

Here is a beehive.	Here they come
But where are the bees?	Out of the hive.
Hidden away	One, two, three, four, five.
Where nobody sees.	

The beehive is a tightly closed fist. Ask the children to open their fists slowly and raise one finger at a time to represent the bees coming out of the hive.

Using the Page

- Draw attention to the word *Checkup* at the bottom of the page. Review that this page helps children to determine their understanding of the work of this unit. If possible, have children read the instructions and interpret what is required. For the first part of the page, they are to record the number of objects in each set. For the second part of the page, they are to draw two pears and five apples.

- After the children have completed the page, ask questions similar to the following to reinforce concepts learned earlier:

"How many sets of oranges are there? Are there more oranges in the first set or in the second set?"

"How many sets of pears are there? Are there fewer pears in the first set or in the second set?"

"How many sets of apples are there? Which set has more apples?"

Games and Activities

Rules for the games on pages 19, 22, 26, 30, and 34

Method 1

Have the children play in groups of from two to five players. The players take turns rolling a specially marked die (a wooden block or a cube of plastic or soft foam will do). A NO throw means that the child must wait until the next turn. Any other throw indicates the number of parts (tails, legs, eggs, windows, flowers) the child may draw on the object (dog, Cathy Caterpuff, nest, house, stems). The player who completes each set of objects first is the winner.

Method 2

Direct the game for the whole class by using a stack of cards that are shuffled and then read out slowly, one at a time. Each card describes a particular attribute or condition. Each child who satisfies the condition may draw the required number of parts on the object. It is possible for several children to win the game simultaneously. The children may offer suggestions for conditions when you are preparing the cards. Make as many condition cards as possible. The following are some suggestions:

1. If you are wearing something red
2. If you had cereal for breakfast today
3. If you have an older brother
4. If you have a Band-Aid on
5. If your birthday is in September
6. If you are wearing glasses
7. If you live in an apartment
8. If you went to a different school last year
9. If you watched television yesterday
10. If you have a pet at home

Poem for page 20

Can you walk on two legs, two legs, two legs?
Can you walk on two legs, round and round and round?

I can walk on two legs, two legs, two legs,
I can walk on two legs, round and round and round.

Can you hop on one leg? etc.

Can you wave with one hand? etc.

Can you wave with two hands? etc.

Linford Holgate

Poem for page 22

Oh children, look at the Caterpuff
There on a leaf of the Jumbo Tree!
Did you ever think that you would see
A Caterpuff walking as proudly as she?

Poem for page 22

Two little boats are on the sea,
All is calm as calm can be.

Gently the wind begins to blow,
Two little boats rock to and fro.

Loudly the wind begins to shout,
Two little boats are tossed about.

Gone is the wind, the storm, the rain,
Two little boats sail on again.

Poem for page 23

THREE LITTLE KITTENS

Three little kittens lost their mittens:
And they began to cry,
"Oh, mother, dear,
We very much fear
That we have lost our mittens."

"Lost your mittens!
You naughty kittens!
Then you shall have no pie."
"Mee-ow, mee-ow, mee-ow."
"No, you shall have no pie."
"Mee-ow, mee-ow, mee-ow."

The three little kittens found their mittens:
And they began to cry,
"Oh, mother, dear,
See here, see here!
See, we have found our mittens!"

"Put on your mittens,
You silly kittens,
And you may have some pie."
"Purr-r, purr-r, purr-r."
Oh, let us have the pie!
Purr-r, purr-r, purr-r."

Poem for page 30

Point to the door.
Clap your hands together,
One, two, three, four.

Point to the floor.
Clap your hands together,
One, two, three, four.

Point to me.
Clap your hands together,
One, two, three.

Point to you.
Clap your hands together,
One, two.

Unit 3 Overview

This unit presents the number zero and the numbers six to nine with their word names and numerals. Exercises require children to identify and to record the number of a set having from zero to nine members, and to draw sets representing these numbers. Subsets, including the empty set (zero), are identified to discover number combinations for six, seven, eight, and nine. The numbers to nine are shown in sequence on a number line and children then have an opportunity to order the numbers to nine using linear models. Measurement topics deal mainly with words that describe positions of objects and one lesson deals with objects that have the same length. Geoboards are used to direct attention to regions that are inside or outside closed figures. The *Checkup* at the end of the unit is designed to test the children's understanding of the numbers to nine.

Unit Outcomes

Number

- identify and record the number of a set having zero members
- identify and record the number of a set having from six to nine members
- recognize and print the numeral 0
- recognize and print the numerals from 6 to 9
- recognize the word *zero*
- recognize the words from *six* to *nine*
- draw sets having from six to nine members
- show number combinations for six, seven, eight, nine
- associate the numbers to nine with points on the number line
- order the numbers from 1 to 9 using linear models

Measurement

- Compare objects with respect to position: *inside*, *outside*, *under*, *on*, *above*, *below*, *between*
- identify objects that have the same length

Geometry

- identify points inside and outside a geometric shape

Background

Number: Zero has been called one of the greatest of human inventions. It serves two basic functions, just as the other nine digits of our base-ten numeration system do. It is both a number and a place holder. In the numeral 403, the 0 holds the tens' place and thereby keeps the 4 in the hundreds' place and the 3 in the ones' place. The 0 also indicates the number of tens just as the 4 indicates the number of hundreds and the 3, the number of ones. Since zero is not a counting number it is sometimes difficult for children to acquire a meaningful concept of it as a number. The teaching suggestions for page 40 were selected to develop a sound understanding of zero.

Just as with the numbers two to five, the numbers six to nine are developed using the "and one more" approach so that the natural order of the numbers is emphasized and reinforced. As in Unit 2, the children are also led to discover number combinations for six to nine, and zero can now be included in these number combinations. In reviewing the combinations for one to five, zero may also be included. It should be noted that

partitioning a set into two subsets involves neither addition nor subtraction, but will provide a foundation for these operations, which will be introduced later.

The number line is introduced as an aid in developing and extending number concepts and also in emphasizing the natural order of numbers. Up to this point the children have approached numbers through sets of objects. By counting the objects in a set they were able to establish the cardinal aspect of the number involved. By numbering points on a line beginning with a point for zero, the children can associate a number with each point. Counting members of sets, which relates to cardinality, is replaced by length and order on the number line, by which the ordinality of number is emphasized. Children are thus able to acquire a newer and broader understanding of number through this simple but effective aid.

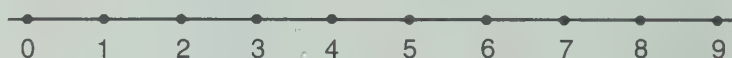
If children have been involved in preparing the number trays for *zero* to *nine* each day, the concept of a number line will seem to be a natural one. Along with the number trays, children will be extending and using their number concept cards and number charts that were started in Unit 2.

Number lines and number strips of various types may be used in the classroom.

Number strip

1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---

Number line



A number strip deals with regions; a number line deals with points. When these are placed on the floor, children have an opportunity to experience number through large-scale physical movement as they walk and count steps. Number lines on strips of paper may be fastened to the display board or to the chalkboard where it is particularly convenient for marking with chalk. Smaller number lines on strips of paper, card, or tape may be used on tables and desks. Activities such as those described for page 58 test more than just mathematical ability: listening skills, competence in responding to instructions, ability in transferring instructions into appropriate actions, and an incidental review of color and shape are also involved.

From time to time, variations of the number line may be introduced. Lines may be used to check the children's knowledge of the numbers and their sequence. Lines may be provided with only specific numbers named, such as the even numbers or the odd numbers. Vertical number lines can provide a look at numbers from a different perspective, but horizontal lines are more practical for most purposes. It is important, however, that a left-to-right order be used consistently with horizontal lines, and a bottom-to-top order with vertical lines. Counting backward on a number line should involve movement in the direction opposite to counting forward; the numbering on the line should not be reversed.

Measurement: Concepts relating to position are reinforced and extended. The ideas *under* and *on* are incorporated with the exercises for the number six, *above* and *below* with the exer-

cises for the number eight. For most children these will not be new words and the discussion of their meanings should not interfere with the new number concepts. *Between* is introduced in terms of physical position (since most children are familiar with this use of the word) and also in terms of the numbers in their natural order. The number line is particularly effective in showing one number between two others. With a gradual reduction of their dependence on the number line (or any other teaching aid), children should be able to discuss in a completely abstract manner which counting number lies between two others.

A discussion of size is directed specifically to identifying objects of the same length, although activities in which the children compare objects will also involve the ideas *long*, *longer*, *longest*, and *short*, *shorter*, *shortest*. Finer perceptual skills are required in comparing lengths of objects if they cannot be placed together, and this is quite difficult for some children. While the children can place objects together in the activities suggested in *Before Using the Page*, the exercises on page 39 can only show the objects aligned to make comparison easier. Further practice may be necessary if tests for conservation of length indicate that certain children have difficulties with this concept. (See page xvi.)

Geometry: The ideas *inside* and *outside*, which have particular significance in geometry, are introduced incidentally in the exercises for number concepts. Later in the unit they are used specifically in relation to closed figures. Through the activities involving geoboards, children may see that some points are part of the sides of the figures, while other points are located inside or outside the figures.

Teaching Strategies

In connection with measuring lengths of objects, use small groups both in the preliminary and follow-up activities. In the preliminary activities for page 39, it is important that each child be able to examine the pieces of materials closely enough to determine which of them have the same length. In the *Related Activities*, you may form groups of four or five children and have each group work with a different color of yarn.

Organization for the work with geoboards on page 60 will be dependent upon the number of boards available. If the supply is less than a class set, it will be necessary to treat this topic in small groups. The kind of exercises on pages 61 to 63 makes it possible to spread the work with geoboards over several days, using four groups of children since the order of treating the pages does not matter.

There are several opportunities for incidental learning in this unit. After the number seven is introduced, the days of the week can be discussed. Children can count the days as they point to their names and discuss which day is first, second, and so on, to reinforce the cardinal and ordinal properties of numbers to seven.

Now that each child has a set of number concept cards for the numbers from zero to nine, these may be used for activities involving numbers. Instead of having only one child respond to a question while the others listen, all the children can respond to the question by holding up the appropriate card for the answer. The teacher can observe the children who responded correctly and those who responded with difficulty.

Materials

display board and cutouts
ribbon, string, and other objects for comparing lengths
number trays for *zero* to *nine*
items for making sets, devices for set holders
flash cards for the words *zero* and *six* to *nine*
index cards for children to use for making number concept cards
specially marked sheets of paper for children to practise printing 6, 8, and 9
strips for printing numerals from copies of page T335
teacher-made cards with patterns of dots or shapes for *zero* to *nine*
attribute blocks or suitable substitute
counters and crayons for each child
regular dice, markers, and tickets for the game on page 46
interlocking Unifix cubes
clothes pins and line, number concept cards for 0 to 8
specially marked dice or condition cards for the game on page 53
large numeral cards for 0 to 9
plastic runner or floor tiles for a number strip from 1 to 9
number line with markers or magnets
number line for each child
straws and pipe cleaners, or D-Stix, for forming triangles and squares
geoboards, rubber bands, four-by-four arrays of dots from copies of page T331
nine cutouts of a clown prepared as described on page T79
overhead projector

Vocabulary

zero	hexagon (optional)
six	above
seven	below
eight	between
nine	long
number strip	longer
number line	longest
ring	short
inside	shorter
outside	shortest
under	the same length
on	as long as

Unit 3 Theme – Odds and Ends

The purpose of this theme is to have the children help you collect “found” objects that they find interesting and that can be used as concrete materials in language and mathematics activities.

Give each child a letter to take home asking parents to save materials for use in the classroom. Children may bring the materials to school once a month on “Collector’s Day”. Useful items include baby-food jars, small plastic bags, beads, small bottles, bottle caps, small boxes, buttons of various sizes, ends of candles, old clothes pins, coffee stirrers, old clocks, corks, cotton balls, broken crayons, paper cups and plates, tongue depressors, scraps of fabric and gift-wrapping paper, plastic knives, forks, and spoons, foil plates and trays, old keys, nails, screws, washers, nuts, rubber bands, short pieces of ribbon, shells, stones, stamps, drinking straws, empty spools, soft sponges, pieces of string, toothpicks, broken toys, cardboard tubes, scraps of wood, and yarn.

Set up a “Collector’s Corner” in which the materials are attractively displayed so as not to give the appearance of just a pile of junk.

LANGUAGE ACTIVITIES

1. What Is It?

Have the children hold up various items, one at a time, from “Collector’s Corner”. Each child holding an item asks, “What is it?” Encourage the children to suggest creative uses for each throwaway item.

2. A Life Story

Choose one interesting item from the “Collector’s Corner”. Discuss with the children its life story from the time it was made until the time it was brought to school. Encourage the children to suggest when and where it may have been made, who bought it, and who used it. You may wish to glue the item to a piece of chart paper and then record some of the information about the item.

3. Unwind-a-Yarn

This activity can be used to reinforce the ability to sequence events. Cut different colors of yarn into strands about a metre long. Tie the strands together and roll them into a ball. Have the children sit in a circle. Begin to make up a story and then pass the ball of yarn to one child. That child is to unravel the ball of yarn and roll it into a new ball while continuing the story, stopping when he/she comes to the end of the first color. Then the ball is passed to the next child who continues the story until the end of the second color is reached. Continue until the last child in the group receives the ball and gives the story a suitable ending.

4. Inventions

Examine the throwaway items with the class and discuss which items could be put together to make something. Have the children use some of the materials from “Collector’s Corner” to invent something and then give each invention a name. Have the children decide which inventions are serious and which are funny. You may wish to have the children write or tell about their inventions.

5. Playground Cleanup

Discuss with the children how the environment looks when the materials in “Collector’s Corner” are spread around. Discuss what the playground is like when it is littered.

Plan a playground cleanup with the whole class. Record the plan on chart paper. Consider the following:

- when to have the cleanup
- kinds of containers to use
- how to clean the whole playground
- what to do with the rubbish collected

You may wish to invite your caretaker to accompany the group to collect any glass that the children may find.

6. Cleanup Classification

Discuss with the children the kinds of things they found on the playground. Make a chart and record the “found” items under such headings as “paper”, “wood”, “metal”, “glass”, “plastic”. When the chart is completed, have the children refer to it and ask them questions similar to the following:

- “Of what material were the most things made?”
- “Of what material were the fewest things made?”
- “Which things are dangerous on the playground?”
- “Which things make the playground most untidy?”

MATHEMATICS ACTIVITIES

1. Ordering Sets

Have the children help to prepare cards for each number from one to nine. Have them glue a set of throwaway items such as bottle caps, popsicle sticks, or scraps of fabric on each card. Use a blank card for the number zero and have the children place the sets in order.

Use many different kinds of materials to encourage the children to work with the cards on their own to reinforce their ability to order the numbers.

2. Match Mates

Use the cards for 1 to 9 from a regular pack of playing cards. Sort the cards by suit. From the two long edges of each card, cut narrow strips to remove the numerals. Discard one of the numeral strips. Over the A for the ace of each suit, glue a piece of paper marked with the numeral 1. Place the remaining parts in an envelope marked to show the suit.

Have the children match each number strip with the correct pattern to reinforce cardinal number concepts.

3. Pick Up Sticks

Collect about twenty tongue depressors or popsicle sticks. Write a numeral from 0 to 9 or a word name from *zero* to *nine* on each stick. Place the sticks in a pile. Each player in turn must try to remove a stick without moving any other stick in the pile. If any of the sticks move, the player must return the stick to the pile and the next player takes a turn. If a player removes a stick successfully, he/she must state the numeral or the word on the stick. If the response is correct, the player keeps the stick and may try to remove another stick. If the response is incorrect, the stick must be returned to the pile before the next player takes a turn. The player who collects the most sticks is the winner.

4. Inside / Outside

Discuss with the children throwaway items from “Collector’s Corner” that are found inside the school and outside the school. Place the items in two groups, one identified as “Found Inside the School” and the other as “Found Outside the School”. When the two groups have been made, ask questions about the items in the groups. For example,

“Which items are discarded only at school?”

“Are there items that are discarded outside the school but used inside the school?”

5. Five Pins

Collect five identical plastic bottles – large detergent bottles are ideal – to be used as bowling pins. Mark the floor with masking tape to show where the pins should be placed. Use a large, soft ball that will roll well on the floor. Rules may be made for the game according to the ability of the children. One version is suggested below.

To reinforce the concept of more than (fewer than), two, four, or six children may play in pairs. Each child takes a turn to see how many pins he/she is able to knock down. The player in each pair who knocks down the greater number of pins scores one point.

6. Button Toss

Glue a paper cup in the centre of a paper plate and allow the glue to dry thoroughly. Collect five buttons of about the same size and mass.

Have two to four children take turns tossing the buttons one at a time into the paper cup. From the results, determine and mark the distance that a player should stand from the plate. As each player completes her/his turn, she/he must determine the answers to these three questions:

“How many buttons did you throw into the cup?”

“How many buttons missed the cup?”

“Did more buttons go into the cup or miss the cup?”

Encourage the children to suggest scoring methods for the game.

7. Button Squares

Sew buttons of various sizes in rows on a square of felt. Glue the felt to a piece of cardboard for support. This device can be used to reinforce such concepts as hand-eye co-ordination, perception and direction, and the counting process.

For hand-eye co-ordination have a child touch buttons according to instructions similar to the following:

a. Touch the biggest button with the thumb.

b. Touch the red button with the smallest finger.

c. Touch the blue button with the middle finger.

For perception and direction ask questions such as:

“What color is the button to the left of the green button?”

“What color is the button to the right of the red button?”

“What color is the button above the blue button?”

“Is the button below the yellow button black or orange?”

“What color is the button between the green button and the black button in the second row?”

For counting, ask questions similar to the following:

“How many buttons are there in the top row?”

“How many red buttons are there in the bottom row?”

“Are there more red buttons or more blue buttons in the second row?”

“Are there fewer green buttons or fewer blue buttons?”

SCIENCE ACTIVITIES

Seeds and leafy tops of fruits and vegetables can be used to provide greenery in your classroom and also exciting experiences for the children. Many seeds and pits grow easily on a window sill. If possible, bring the whole fruit or vegetable to the classroom. Have the children examine the color, shape, texture, and, of course, the taste. Because some of these things will be new to some children, give them only a taste at first.

Styrofoam cups, tin cans, and plastic tubs are throwaway items that you can use for containers. A heated nail can be used to make holes for drainage in plastic tubs. You will need stones for drainage and, of course, soil. Because potting soil from a nursery or a garden centre is sterilized, it is the best to use.

1. Planting Seeds

Let the pit from a very ripe avocado dry overnight and then peel off the brown outer layer. Plant the pit with the pointed end up and showing through the soil. An avocado grows in proportion to its container. If you want a large plant, put the pit in a large container. Place the container on a window sill and water the pit regularly. In about two months a tiny green shoot will appear.

Seeds from oranges, grapefruit, and tangerines produce plants with shiny green leaves. Soak the seeds about two or three days in warm water to soften the seed coat and to hasten germination. Then plant the seeds about 2 cm deep in soil. Water regularly and watch for the first signs of green after about one month.

Seeds from a watermelon, cucumber, pumpkin, or squash will provide vines for around a window. Soak the seeds in water overnight and then plant them 2 cm deep in soil. Water regularly and watch for sprouts within two weeks.

2. Growing Tops

Tops of carrots, turnips, parsnips, and beets will grow in water. Cut off about 3 cm of the top of the root and place it in a shallow container holding about 3 cm of water. Each cutting will grow a feathery top.

Even the top of a pineapple will grow. Cut off the top, leaving about a depth of 3 cm of fruit attached to it. Let this part dry overnight. Mix some dried-out coffee grounds in potting soil to make the soil acidic. Plant the pineapple so that the soil covers the fruit. Water regularly and watch for new leaves coming up from the centre after about a month.

3. Odd Insects

Collect metal bottle caps, plastic tops and covers, and corks for this activity. Have the children choose as many of these as they need to make a “bug”. When they have decided on the shape it will have, they may color the caps with poster paint. When the caps are dry, the children can arrange them on a piece of tagboard, gluing the caps to hold them in place. Pipe cleaners or strips of construction paper can be used for legs, wings, and antennae.

4. Stone Animals

Obtain smooth, rounded rocks on which the children can paint a favorite animal. The rocks must first be painted with thick tempera and allowed to dry. The children can then paint the animal’s features on the rock or glue on such things as eyes, ears, whiskers, legs, and tails. When all the animals have been completed, encourage children to tell other members of the class about their creations.

SOCIAL STUDIES ACTIVITIES

Discuss with the children how the people who first came to this country did not have all the things we now have. Many things that we throw away would be used by the pioneers for useful household items.

1. Quilts

Make cardboard patterns measuring 10 cm by 10 cm. Have each child cut a square patch from a piece of fabric. Have the children sew the square patches in rows of five and then sew the rows together. Press the seams open. Use part of a discarded sheet to make a back for the quilt the same size as the top. With the right sides facing, sew the two pieces together, leaving one end open. Turn to the right side and press again. Place a layer of cotton batting inside and close the open end with a slip stitch. On the patchwork side where the corners of the square patches meet, thread yarn through the layers and tie the yarn in a double knot. Cut off the ends of the yarn to make a feathery tab. This quilt can become a wall hanging for the reading centre.

2. Rag Rugs

Tear fabric into strips 3 cm wide. Sew these together end to end until you have three long "snakes". Sew the three snakes together at one end. Begin braiding the snakes, keeping the tension uniform. After the braiding has been started, fasten the end to a leg of a chair and let children continue the braiding. Sew on more strips as required. When the braid becomes long, begin to coil it and use thread to fasten adjacent rings together on the underside. This rug can be placed in the centre of a table.

ART ACTIVITIES

1. Cylinder Printing

Glue bits of string around a cardboard tube from a roll of paper towels or waxed paper. Roll the tube gently through a tray of tempera paint. Roll it once on a sheet from a newspaper to blot the excess paint. Have the children roll the tube on paper to make various patterns.

2. Mobiles

Have the children glue bits of ribbon, yarn, fabric, paper, and so on, to the inner surfaces of the Styrofoam trays used for packaging meat. Use colored yarn or string to hang the decorated trays from a coat hanger.

You may wish to have the children cut two-dimensional shapes (circles, squares, rectangles, triangles) from the trays and hang these to coat hangers to make "Shape Mobiles".

3. Litter Mates

Draw a simple outline of a girl and of a boy on a sheet of construction paper. Have the children glue various items from the "Collector's Corner" to suggest features and clothes for each "individual".

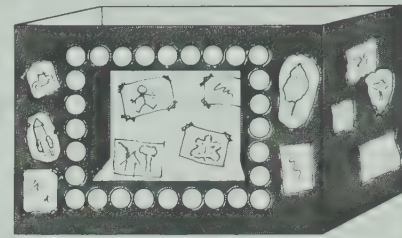
4. An Art Gallery

Try to obtain a large cardboard box in which a stove or a television set was packed. Use this box to create a display case for the children's art.

Cut off the flaps and then cover the outside of the box with black paper. Place circular shapes cut from aluminum foil along the open edges of the box to represent stage lights.

Examples of the children's art can be taped to the outer walls of this box. Art can also be taped to the inside walls to create an "art gallery".

By cutting a window that will open and close, this box can be adapted to become a puppet theatre.



MOVEMENT ACTIVITIES

1. Ring Toss

Collect the round plastic covers from containers for ice cream, cottage cheese, or soft margarine. Using a knife or scissors, cut each cover 1 cm from the edge to obtain a plastic ring. Fill detergent bottles or bleach bottles with sand. Organize the children into teams or small groups and have them try to throw the rings over the bottles.

2. Plastic Scoops

Collect large bleach or fabric softener bottles. Glue the caps in place. Cut the top off each bottle just below the handle. These scoops can be used by the children for throwing-and-catching games, using a small, light ball.

MUSIC ACTIVITIES

Discarded household containers lend themselves to the making of musical instruments. Children will enjoy exploring the different sounds.

1. Drums

Stretch heavy plastic sheeting over the open ends of cans of various sizes and secure it with rubber bands or heavy cord. Have the children play the drums by tapping with their fingers. Drumsticks can be made by tying wads of fabric or cotton batting over the ends of pencils.

2. Bottle Shakers

Pour a small handful of gravel, beans, or grain into small plastic bottles with long necks, such as those used for bleach or vinegar. Glue on the caps. When the bottles are shaken, each material will produce a different sound.

3. Kazoos

Try to collect enough cardboard tubes so that there will be one for each child in the group. If the tubes are different in size, different sounds will be produced.

Wrap a piece of wax paper smoothly and tightly around one open end of a tube. Place a rubber band about 2 cm below the end of the tube to hold the wax paper securely in place. Using a sharp pencil, make a hole about 1 cm above the rubber band. Push the pencil through until the tip almost reaches the opposite side of the tube and then remove the pencil. Now the kazoo is ready to play. Hold the open end of the kazoo in front of your mouth. Pucker your lips and begin to hum a favorite tune. After the children have had some practice, encourage them to hum or sing in unison.

LESSON OUTCOME

Identify objects that have the same length

Materials

display board, ribbon, objects for comparing lengths (pencils, crayons, pipe cleaners), pieces of string of different lengths

Vocabulary

long, longer, longest, short, shorter, shortest, the same length, as long as

RELATED ACTIVITIES

- Cut drinking straws, pipe cleaners, or dowels so that there are several different lengths. For each particular length, make two or three pieces that have the same length. Have the children sort the pieces to find the ones that have the same length.
- Cut about 25 to 30 pieces of yarn of various colors in about five different lengths. Have children sort the pieces of yarn according to color and then arrange the pieces in each set from shortest to longest. If two or more pieces of the same color have the same length, have the children record the information in a chart as shown below.

Color	Number of Pieces
red	2
blue	3
green	4

Use a ✓ to show the objects that have the same length.

Identifying objects that have the same length

(thirty-nine) 39

LESSON ACTIVITY

Before Using the Page

- Cut two pieces of ribbon of different lengths and colors for the display board. Place them horizontally with the left ends aligned. Ask children to identify the longer piece. Include a third piece of another color that is the same length as one of the other pieces. Ask the children to describe the pieces of ribbon. Lead them to use the expression "the same length".
- Cut four pieces of ribbon, two of which have the same length. Arrange the pieces vertically on the display board so that the ends are aligned at the bottom. Ask the children to compare the four pieces; for example, to indicate the longest, the shortest, and the two pieces that have the same length.
- Place various objects on a table. Ask children to choose two or more objects that have the same length. Repeat several times.
- Cut pieces of string in different lengths. Give one piece to each child. Have the children try to locate something in the

classroom that has about the same length as each piece of string.

Using the Page

- Read the word "Mark" with the children and explain that they are to use a ✓ to show the objects in each set that have the same length. After they have completed the page, you may wish to ask the children questions about objects in each set. Some of these questions may be as follows:
 - "How many crayons are there in the first set? Which of the crayons is the longest?"
 - "How many pieces of ribbon are there? Which piece of ribbon is the shortest?"
 - "Find the fourth set. Which pencil is the longest?"
 - "Which piece of chalk is the longest?"
 - "How many pieces of chalk are shorter than the white piece?"
 - "Which screw is shorter than the second screw?"

LESSON OUTCOME

Recognize the set with zero members;
recognize and print the numeral 0;
recognize the word *zero*

Materials

the number trays for *one* to *five*, small objects, number tray for *zero*, a card for demonstrating *zero*, a strip for printing 0 from copies of page T335 for each child

Vocabulary

zero

Background

Children find the concept of *zero* a difficult one. *Zero* is not just a place holder; it is a number just as *one*, *two*, *three*, *four*, and *five* are numbers. In Unit 2 the numbers from one to five are introduced by relating them to sets having from one to five members. *Zero* is introduced in a similar way. *Zero* is the number for the set having no members.

RELATED ACTIVITIES

• If the children completed the work sheets suggested in *Related Activities* on page T42, use these now to discuss the number of scoops of ice cream for each cone. Ask the children to color red each cone showing zero scoops, yellow each cone showing one scoop, and so on.

LESSON ACTIVITY

Before Using the Page

• Display the number trays for *one* to *five* on a table and have a child place them in order. Check that the appropriate number of objects is in each tray. Point to the tray for *five* and ask how many objects there are in it. Do this for the trays for *four*, *three*, *two*, and *one* in that order. Place an empty tray beside the tray for *one*. Ask how many objects there are in the new tray. Emphasize that there are *no* objects in the set.

Hold up a card on which there is a ring for a set holder, but no objects are shown within the ring. Print a 0 outside the ring on the card while the children watch. Introduce the word *zero*. Tell the children that the number for the set with no members is zero. When reading the numeral 0, encourage the children to say “zero” rather than “oh”.

• Have the children use hand and arm movements to form 0's in the air. Check that they start at the top and move in a counterclockwise direction.

• Start at the tray for *zero* and review the idea of one more. Ask, “How many more objects are there in the tray for *one*

Mark.

0 zero

Print.

0 0 0 0 0 0 0 0 0 0

40 (forty)

Recognizing sets of zero; printing the numeral 0

Use it to show sets of zero

than there are in the tray for *zero*?” “How many more objects are there in the tray for *two* than there are in the tray for *one*?”

• Ask questions such as: “How many children in this room have three eyes (hands, feet)?” “How many chairs in this room have five legs?”

Make up funny rhymes for the children to answer; for example:

“How many elephants in this room?

How many porcupines on the moon?”

Using the Page

• Ask the children to look at the set at the top of the page that has no members. Ask them to point to the numeral 0 and then to the word *zero*. Emphasize that 0 and *zero* are names for the same number. Then have the children mark only the sets having zero members.

• Have the children trace over the two broken 0's and then practise on their own to complete the row. Give each child a strip for printing 0 from copies of page T335. When the children finish practising, ask them to print or paste their best 0 on the patch.

LESSON OUTCOME

Record the number of a set having from zero to five members

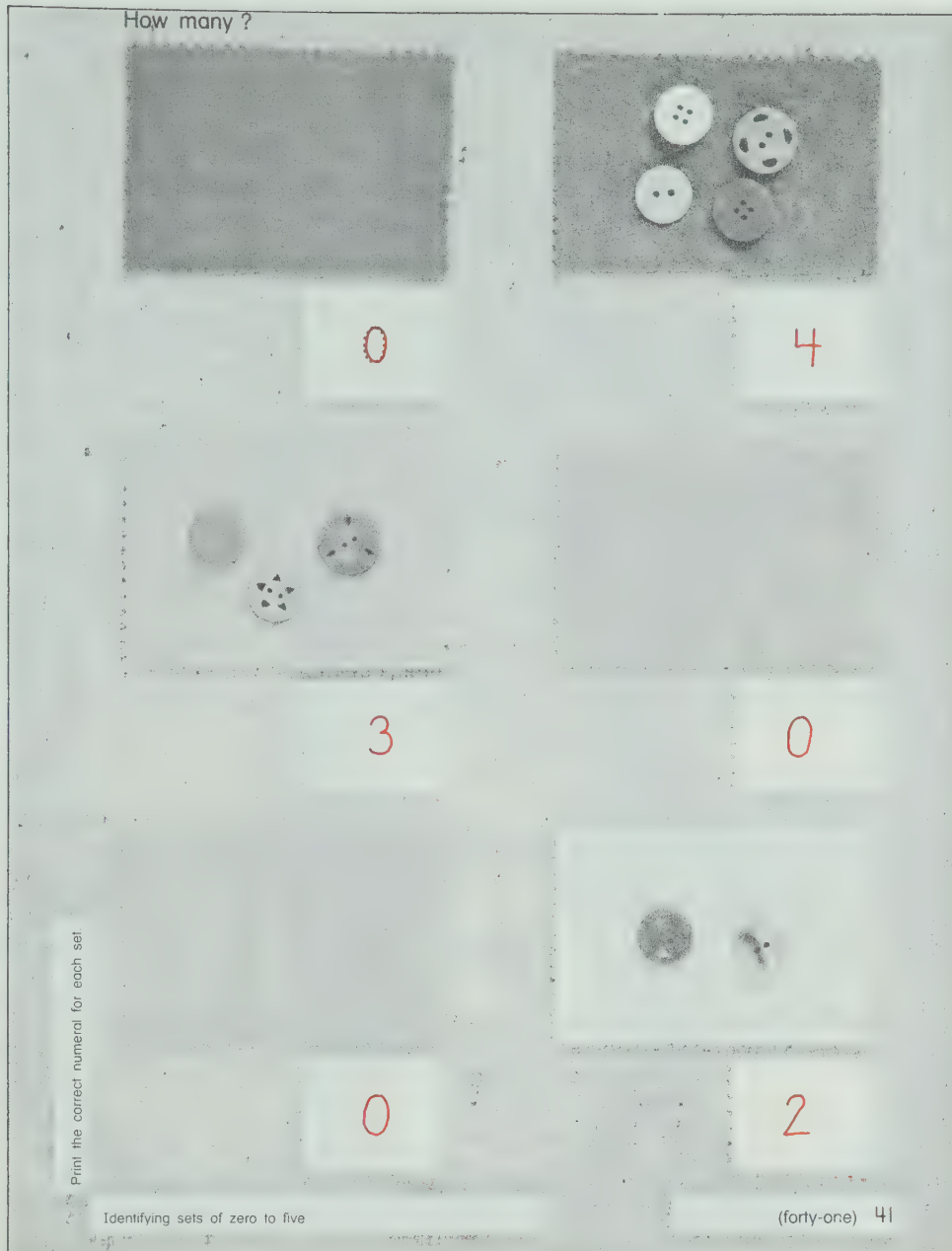
Materials

six set holders, small objects, flash card for *zero*, an index card for each child

RELATED ACTIVITIES

- Have the children print 0 above the 1 on their number charts. Print the word *zero* on a strip of paper for each child and have them paste the word beside the numeral 0.
- Give each child an index card. Have the children make a number concept card for *zero*.
- Read the poem about five little pussycats on page T83. Pause when you come to the last word in each couplet and have the children say what the word should be. Some children will think of the number that is one less than the number named; other children will think of the correct rhyming word.

You may wish to read the poem again, having five children sit at the front of the classroom and pretend to be the pussycats. Have each "pussycat" leave at the appropriate place in the poem.



LESSON ACTIVITY

Before Using the Page

- Display six set holders. Ask children to place objects in the set holders to make sets of from zero to five objects. When the sets have been completed, ask a child to point to the sets and state the number of objects in each set. Then go in the opposite order and ask children to state how many objects there are in each set. When you ask how many objects there are in the set for zero, some children may say, "None." Remind them that the symbol for none is 0 and its name is "zero".
- Place five objects on a table. Ask the children how many there are. As each one is taken away, have the children count backward saying, "Four, three, two, one, zero." Do this many times until the children appear to be familiar with the sequence.
- Place yourself in the classroom so that the children can see you but not your hands. Knock on a desk or wall three times and have the children state the number of times you knocked. For *zero* do not knock at all, but ask the children the number of

times you knocked. Accept only the answer "zero". Continue with the numbers to five, but give zero more attention.

- Read the poem about the mice that appears on page T83. Have five children pretend to be the mice while performing appropriate actions.
- Show a flash card for the word *zero* and use it several times during the day to strengthen recognition of the word.

Using the Page

- Have the children record the number of buttons on each patch.
- After the children have completed the page, ask them questions to reinforce concepts learned previously.
 - "How many large patches have zero buttons?"
 - "What is the color of the third patch?"
 - "How many red buttons are there on the blue patch?"
 - "Are there more buttons on the dark green patch or on the blue patch?"
 - "How many buttons are there on the blue patch and the pink patch together?"
 - "How many red buttons are on all the patches?"

LESSON OUTCOME

Distinguish between *inside* and *outside*; recognize *zero* as one of a sequence of numbers

Materials

the number concept cards made by the children, small objects and a set holder, overhead projector (optional), crayons for each child



Vocabulary

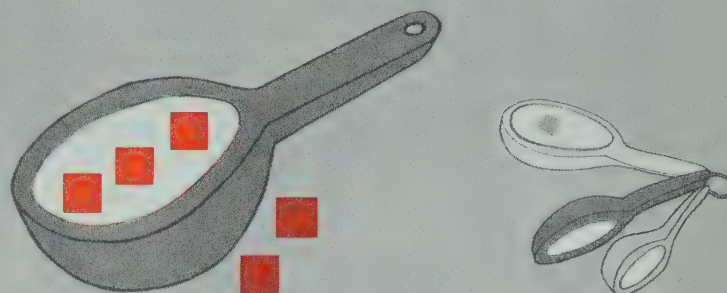
inside, outside

RELATED ACTIVITIES

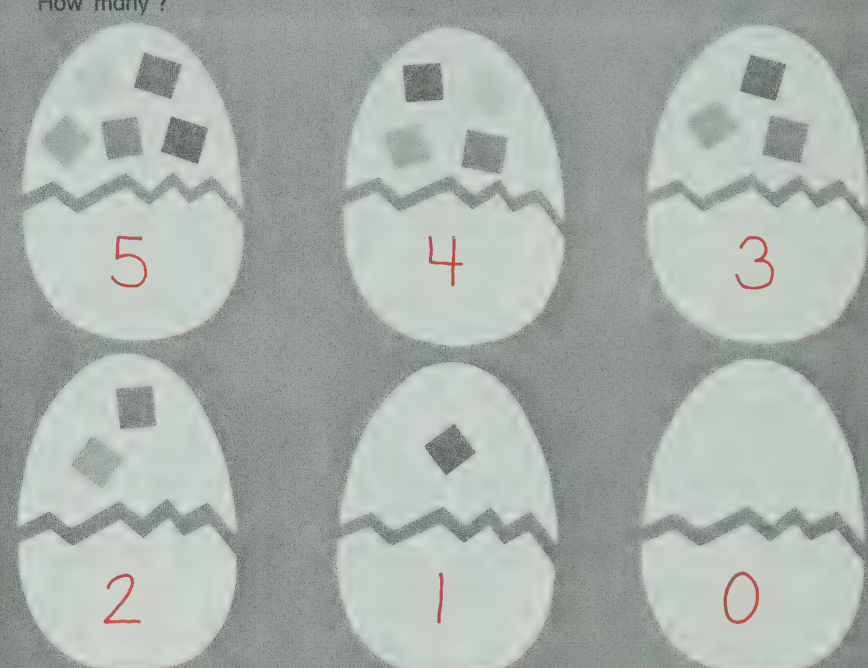
- Place pictures of five birds on the display board. Read the poem given for this page on page T83. Pause when you come to some of the number names, point to the pictures of the birds, and let the children say the missing words. For the second stanza, remove one of the birds from the display board and continue as before. Continue until all the birds have “flown” away. You may wish to have the children draw pictures to illustrate this poem.
- Play the game “Cover-up” as described on page T324.

Draw.

three  's inside the spoon two  's outside the spoon



How many ?



Print the correct numeral for each set.

42 (forty-two) Introduction to the concepts *inside* and *outside*; identifying sets of zero to five

LESSON ACTIVITY

Before Using the Page

- For this activity you may wish to work with the children in groups. Have each child use her / his number concept cards.
- Display a set of objects, for example, two pencils. Ask the children to hold up their cards that tell the number of pencils. You can see quickly whether all the children are holding up their cards for *two*. If some children regularly look around and change their answers, you may wish to have them do the activities suggested on page T50. You may prefer to display pictures of sets having from zero to five members rather than the objects themselves, or use small objects on the overhead projector.
- Place an object inside a set holder and another outside the set holder. Ask several children to describe the position of each object with respect to the set holder, using the words *inside* and *outside*. Then ask some children to place objects inside or outside the set holder according to your instructions.

Using the Page

- For the first part of the page, read the words with the children and have them draw the red and the yellow square shapes.
- After the children have drawn the shapes inside and outside the large red spoon, reinforce the concept of zero by asking the following questions:
 - “How many blue shapes are there in the blue spoon?”
 - “How many green shapes are there in the yellow spoon?”
 - “How many blue shapes are there in the small red spoon?”
 - “How many green shapes are there in the large red spoon?”
 - “How many black square shapes are there on the page?”
- For the second part of the page, have the children record the number of shapes on each egg shell. After the children have completed the page, ask what they notice about the order of the answers. Then have them count backward from five to zero by reading the numerals that they printed on the egg shells.

LESSON OUTCOME

Recognize a set of six; recognize and print the numeral 6; recognize the word *six*

Materials

display boards and cutouts, small objects; a sheet of paper to practise printing 6, a strip for printing 6 from copies of page T335, and an index card for each child

Vocabulary

six

RELATED ACTIVITIES

- Have the children find or make sets of six objects in the classroom; for example, they may use books, chairs, pencils, crayons.
- Hold up pictures of sets and ask children to clap hands for the number of each set. Include sets of six more often than other sets.
- Have the children continue their number charts by drawing or pasting pictures of six objects and printing the numeral 6 beside them. Print the word *six* on a strip of paper for each child. Have the children paste the word beside the numeral 6 on their number charts.
- Give each child an index card. Have the children make a number concept card for *six* in the same way as for *zero* to *five*.

Mark.

6 six

Use a ✓ to show sets of six.

Print.

Recognizing sets of six; printing the numeral 6

(forty-three) 43

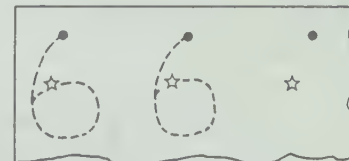
LESSON ACTIVITY

Before Using the Page

- Continue to emphasize the one-more pattern of the whole numbers. Ask, "How many children are standing in front of the class?" (zero). Ask one child to stand in front of the class. Ask how many there are now. Ask another child to join the first one. Ask, "What number is one-and-one-more?" Ask a third child to join the others. Ask, "What number is two-and-one-more?" Continue until there are five children in the group. Ask a sixth child to join the others. Now say, "Five and one more are six." Print the numeral 6 on the chalkboard. Ask another child to come and point to each child in turn while the rest of the class says in unison, "One, two, three, four, five, six."
- Place one cutout on the display board and place the numeral 1 beside it. Ask a child to place another cutout beside the first one and replace the 1 with the numeral 2. Have other children continue the sequence until a set of six has been formed.
- Draw a set of six objects on the chalkboard. Ask how many

objects there are in the set. Print the numeral 6 beside it, following the green dot, yellow arrows, and red dot sequence shown on page 43. Have the children use hand and arm movements to form 6's in the air.

- Give each child a sheet of paper marked as shown. Have the children begin at the dot, follow the dashes, and stop at the star.



Using the Page

- Direct the children's attention to the set of shells at the top of the page. Ask how many shells there are in the set. Have the children point to the numeral 6 and read the word *six*.
- Have the children mark only the sets that show six objects.
- Have the children trace over the two broken 6's and then practise on their own to complete the row. Give each child a strip for printing 6 from copies of page T335. When the children finish practising, ask them to print or paste their best 6 on the empty can.

LESSON OUTCOME

Record the number of a set having from zero to six members

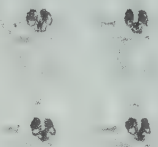
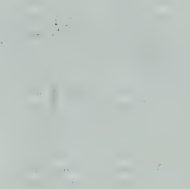
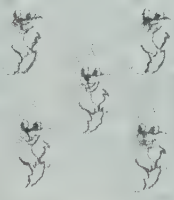

Materials

teacher-made cards, the number concept cards made by the children, number tray, flash card for *six*

RELATED ACTIVITIES

- Prepare charts or individual cards with sets of zero to six shapes on them. Place one of these charts or a set of cards under a sheet of acetate on which the children can mark. Have the children draw the shapes necessary to make each set a set of six.
- Play the game "And One More". Mention a phrase or a title that includes a number. Ask the children to replace the number with the number that is one more. For example, if you say "three blind mice", the children would respond "four blind mice". If you say "four fat fish", the children say "five fat fish".

How many ?

		
6	5	6
		
4	6	3
		
5	0	6

44 (forty-four)

Identifying sets of zero to six

Print the correct numeral for each set.

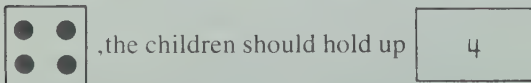
LESSON ACTIVITY

Before Using the Page

- Hold up one of a set of teacher-made cards similar to the following:



Have the children hold up their number concept card that corresponds to the number for your card. For example, if you hold up



Have each child hold the card so that you can check it at a glance. Repeat by holding up the cards at random.


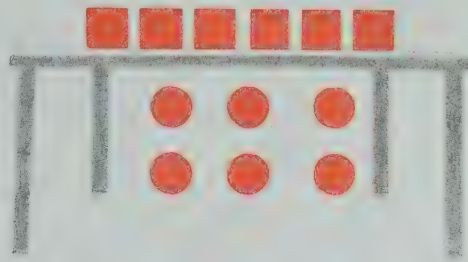
- Draw a set of six objects on the chalkboard. Ask how many objects there are. Print 6 beside the set and then the word *six*. Emphasize that the numeral 6 and the word *six* both tell how many objects there are in the set.

- Make a number tray for *six* in the same way as for *zero* to *five*. While the children watch, print the word *six* on a strip of paper or a label and paste it on the end of the number tray.
- Show a flash card with the word *six* and use it several times during the day to strengthen recognition of the word. The children will be able to practise reading the word on pages 45 and 46.

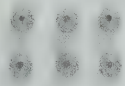
Using the Page

- Have the children record the number of objects in each set.
- When the children have completed the page, ask questions similar to the following:
 "How many of the sets show six things?"
 "Find the set of kittens. How many blue kittens are there? How many red kittens are there? How many kittens are there in all?"
 "Find the set of mice and the set of rabbits. Are there more mice or more rabbits? How many more are there?"

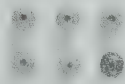
Draw.

six  's under the tablesix  's on the table

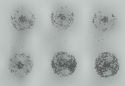
Match.



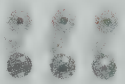
6 and 0



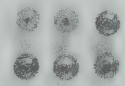
5 and 1



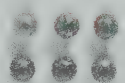
4 and 2



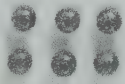
3 and 3



2 and 4



1 and 5



0 and 6

Match and then print the numerals.

Understanding six

(forty-five) 45

LESSON OUTCOME

Draw a set having six members; show number combinations for six

Materials

small objects, attribute blocks, crayons for each child

Vocabulary

under, on, hexagon (optional)

RELATED ACTIVITIES

- If your sets of attribute blocks contain hexagonal shapes, you may wish to direct the children's attention to the shape containing the numeral 6 and the word *six* on this page. Have the children count the sides and the corners. Tell them that a shape that has six sides has a special name: it is called a *hexagon*. Hold up a hexagonal shape from the attribute blocks. Have the children identify other blocks having this shape. Then have them trace around the hexagonal shapes to make a pattern. Have them color their patterns.

LESSON ACTIVITY

Before Using the Page

- Place a chair in front of the children. Place several different objects on the chair and several under it. Ask children whether a certain object is *under* the chair or *on* the chair. Repeat a number of times and then switch the positions of some of the objects and continue asking the appropriate questions.
- Ask children to place from zero to six objects under a table, on a table, under a desk, on a shelf, and so on.
- Draw the trunk and branches of a tree on the chalkboard. Have children, in turn, draw from zero to six leaves on the tree. Have other children, in turn, draw from zero to six leaves under the tree. Give as many children as possible a chance to draw leaves on or under the tree.
- Display six round attribute blocks. Ask how many blocks there are, how many are round, and how many are square. Replace the sixth block with a square block and repeat the questions. Replace the fifth block with a square block and

repeat the questions. Continue the procedure until there are zero round blocks and six square blocks.

- Place a number of attribute blocks on the table and ask children to include other blocks to make a set of six. In each case, ask how many are needed to make a set of six. Have them say, for example, "Three and three are six" or "Two and four are six."

Using the Page

- Read the words with the children. Have them draw six circular shapes under the table and six square shapes on the table.
- For the second part of the page, discuss the first two sets with the children. In the first set, have them note that there are six orange beads and zero green beads. Have them trace over the line joining the set and the phrase "6 and 0". Point out that the "6" is shown under the orange bead and the "0" is shown under the green bead. Repeat the procedure for the second set and then let the children continue on their own, drawing the lines for matching and printing the numerals required.

LESSON OUTCOME

Match the words and the numerals for 0 to 6

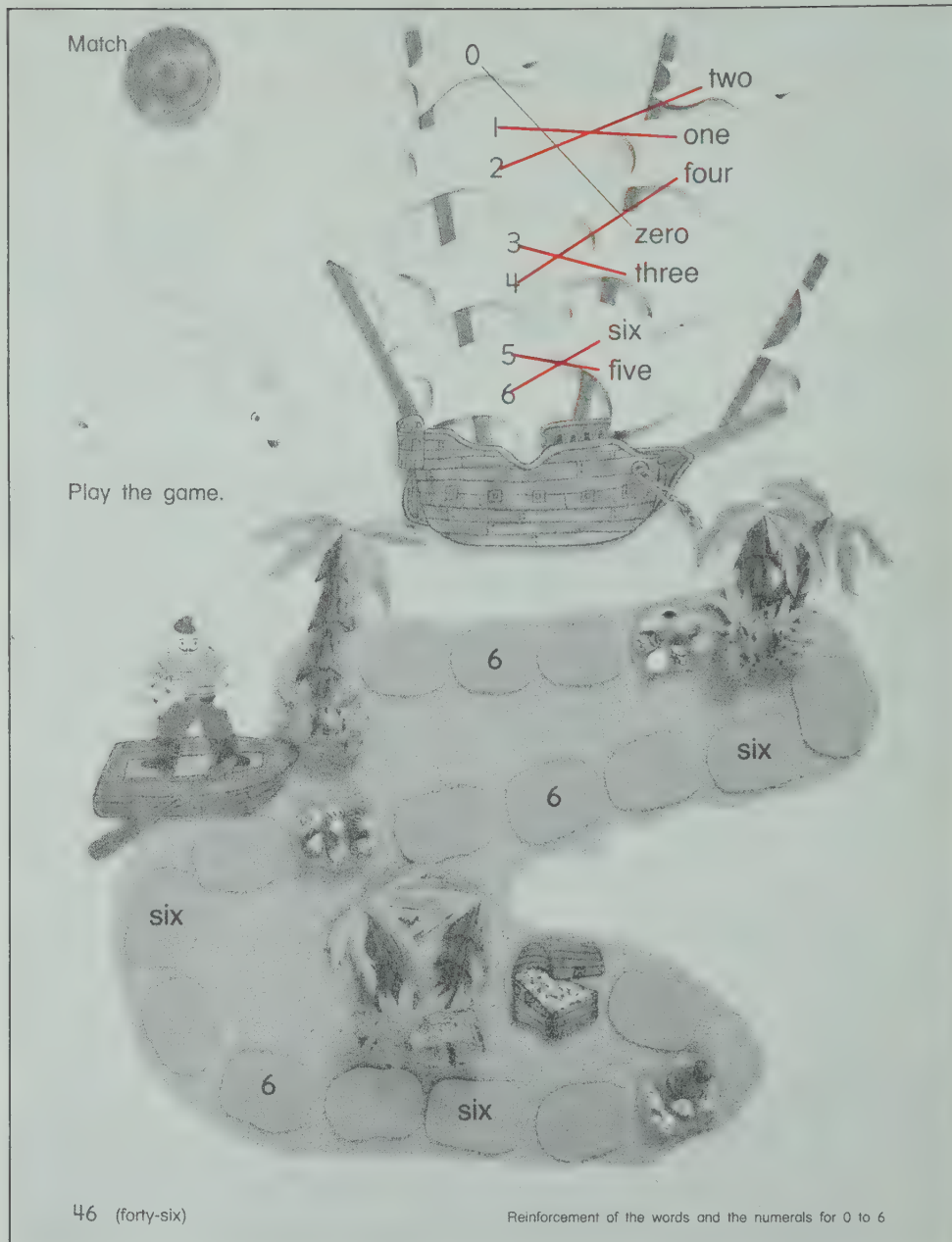
Materials

flash cards for the words *zero* to *six*, the number concept cards made by the children, display board and cutouts, counters, regular dice, markers, and tickets for the game

RELATED ACTIVITIES

- Adapt the game "Cover-up" as described on page T324. Use a regular die, six blank cover-up cards, and a game board showing the numerals 1 to 6. If the children play in pairs, have each pair use one game board. The first player rolls the die to cover numerals until he / she rolls a number that has already been covered. Then the second player takes over and rolls the die to uncover numerals until he / she rolls a number that is already uncovered. Play continues back and forth until one player has covered (or the other player has uncovered) all the numerals.

- Display six counters on the overhead projector. Ask the children to tell how many "houses" there are in your "village". Place a pencil on the projector to separate the counters into a set of five and a set of one. Tell the children that now there is a "road" in the village. Point to each set in turn and ask how many "houses" there are on that side of the "road". Repeat for other positions of the "road".



LESSON ACTIVITY

Before Using the Page

- Review the number six by finding examples of it as it relates to the children. Many children in your class will be six years old and will have had six candles on their birthday cakes. They can see the numeral 6 on the clock and on the calendar. A house on their street may have a 6 on it or there may be six persons in some families. Discuss as many examples as you can find.
- Use flash cards showing the words *zero* to *six*. Display the cards and determine whether the children recognize the words. If they do, have them hold up the corresponding number concept card from their sets, as you show a word for a number.
- Give each child a set of six counters. Place three cutouts on the display board. Have the children place the same number of counters on their desks. Then ask them to use other counters to make a set of four, five, or six. When they have made their sets, ask one child to state the result; for example, "Three and

three more are six." Repeat as many times as possible to give each child a chance to respond.

Using the Page

- To make certain that the children can read the words on the sails, have children take turns in reading the words from the top to the bottom. Then have the children draw lines to match the numeral and the word for each number from 0 to 6.
- Have the children play the game alone with one die or in pairs taking turns in tossing one die. They may wish to use markers to indicate their positions on the path.

The children advance along the path according to the number on the die. If a player lands on *six* (word, numeral, or six shells), he / she wins a ticket that represents a bag of gold coins. The player with the most tickets (bags of gold coins) at the end of the game is the winner.

LESSON OUTCOME

Recognize a set of seven; recognize and print the numeral 7; recognize the word *seven*

Materials

display board and cutouts, small objects, a strip for printing 7 from copies of page T335 and an index card for each child

Vocabulary

seven

RELATED ACTIVITIES

- Have the children continue their number charts by drawing or pasting pictures of seven objects and printing the numeral 7 beside them. Print the word *seven* on a strip of paper for each child. Have the children paste the word beside the numeral 7 on their number charts.
- Give each child an index card. Have the children make a number concept card for *seven* in the same way as for *zero* to *six*.
- Read the story *Snow White and the Seven Dwarfs* to the children. Have the children draw pictures of the story or paint a mural, if you wish.

Mark.

seven

Use a , to show sets of seven.

Print.

Recognizing sets of seven; printing the numeral 7

(forty-seven) 47

LESSON ACTIVITY

Before Using the Page

- Place one cutout on the display board and ask the children how many there are. Place the numeral 1 beside it. Place two cutouts on the board and ask how many there are. Place the numeral 2 beside the cutouts. Have one child state, "One and one more are two." Continue in this way until you place seven cutouts on the board. Say, "Six and one more are seven." Place the numeral 7 beside the cutouts. Ask a child to come and point to each cutout in turn while the rest of the class says in unison, "One, two, three, four, five, six, seven."
- Place sets of from one to six objects around the classroom. Ask children to include objects to make each set a set of seven. Ask other children to check the work by counting the objects in each set.
- Draw a set of seven objects on the chalkboard. Ask how many objects there are in the set. Print the numeral 7 beside it, following the green dot, yellow arrows, and red dot sequence

shown on page 47. Have the children use hand and arm movements to form 7's in the air.

Using the Page

- Direct the children's attention to the set of shells at the top of the page. Ask how many shells there are in the set. Have the children point to the numeral 7 and read the word *seven*.
- Have the children mark only the sets that show seven objects.
- Have the children trace over the two broken 7's and then practise on their own to complete the row. Give each child a strip for printing 7 from copies of page T335. When the children finish practising, ask them to print or paste their best 7 on the island.
- After the children have completed the page, ask them how many more shells would be needed in the sets with fewer than seven shells so that there would be seven shells in each set.

LESSON OUTCOME

Record the number of a set having from zero to seven members

Materials

teacher-made cards, the number concept cards made by the children, number tray, flash card for *seven*

RELATED ACTIVITIES

- Print the names for the days of the week in order on chart paper. Ring the name for today. Say to the children, "Sunday is Day 1, what day is today?" Use the words for the ordinal number concepts informally by asking, "What is the first day of the week?" "What is the second day of the week?" and so on.

- Make a "Day-train" for the children to work with. You will need seven cards. Draw an engine on one card and a car for the train on each of the other cards. Print *Sunday* on the engine and the names of the other days on the cars. Have the children put the cars of the train in order. You may wish to print the numerals 1 to 7 on the backs of the cards so that the children can check that the cards are in the correct order.

How many ?

LESSON ACTIVITY

Before Using the Page

- Use the teacher-made cards suggested on page T62 and include one card showing seven shapes. Stand at the front of the classroom and hold up one of the cards. Have the children hold up their number concept card that corresponds to the number for your card. Repeat as often as time permits.
- Draw a set of seven objects on the chalkboard. Ask how many objects there are. Print 7 beside the set and then the word *seven*. Emphasize that the numeral 7 and the word *seven* both tell how many objects there are in the set.
- Make a number tray for *seven* in the same way as for *zero* to *six*. While the children watch, print the word *seven* on a strip of paper or a label and paste it on the end of the number tray.
- Show a flash card with the word *seven* and use it several times during the day to strengthen recognition of the word.

Using the Page

- Have the children look at the first set of beads. Ask how many there are on the leaf. Ask them to trace over the 7 and

then have them record the number of beads in each of the other sets.

- When the children have completed the page, ask questions similar to the following:
 "How many of the sets show seven beads?"
 "Find the two sets of yellow beads. How many beads are there in one set? How many beads are there in the other set? How many more beads are there in one set than in the other set?"
 "Find the two sets of round orange beads. How many beads are there in one set? How many beads are there in the other set? How many fewer beads are there in one set than in the other set?"
 "Find two sets of beads that have the same number of beads. What is the number of beads?"
 "Which numbers from zero to seven do not have sets on this page?"

LESSON OUTCOME

Draw a set having seven or fewer members; show number combinations for seven

Materials

loops of string for set holders, attribute blocks, counters or small objects, crayons for each child

RELATED ACTIVITIES

- Adapt the second activity from *Related Activities* on page T64 for seven.

- Have the children work with their number concept cards. Have them arrange the cards in order with either side of the card face up. With eyes closed, each child removes one card from the set and then looks at the remaining cards to determine which card is missing. Then they check by looking at the card they withdrew. Children may work at this activity in pairs. You may prefer to work with a large group and use number concept cards placed on the chalkboard ledge.

- Make a copy of the names of the days of the week for each child. Ask the children to cut them out and paste each one at the top of a sheet of paper. Then have them arrange the sheets to form a "book". On each day for seven days starting today, ask the children to draw a picture of something they do that day. At the end of the seven days, ask the children to tell about their drawings.

Draw.

Draw apples on each tree to match the number shown.

How many?

7 and 0 6 and 1 5 and 2 4 and 3

3 and 4 2 and 5 1 and 6 0 and 7

Understanding seven (forty-nine) 49

LESSON ACTIVITY

Before Using the Page

- Place two loops of string on a table to serve as set holders. Place three attribute blocks inside one loop and four attribute blocks inside the second loop. Ask children to count to find the number of attribute blocks in the two sets.

Rearrange the blocks to show two blocks inside one loop and five blocks inside the second loop. Ask children to find the number of blocks in the two sets. Repeat the procedure for seven and zero, and for six and one.

- Using the two loops of string as set holders, place two blocks inside one loop. Ask children how many blocks should be placed inside the second loop so that there will be seven blocks inside the two loops. Repeat the procedure, starting with three, one, four, six, seven, five, and zero blocks in turn.

- Place sets of from zero to six counters on a table and ask children to place other counters to make each set a set of seven. In each case, have children say; for example, "Six and one are seven," "Five and two are seven," "Four and three are seven."

Using the Page

- Discuss with the children that they are to draw apples on the trees according to the number shown on the trunk of each tree. Ask how many more apples must be drawn on the first tree.

- For the second part of the page, have the children record the number of yellow buttons in each set. After the children have completed the eight number combinations for seven, have them make a statement for each pair of numbers; for example, "Six and one are seven."

- After the children have completed the page, you may wish to have the children count backward by using the numbers on the trees. You may also wish to use this sequence to reinforce the concept *fewer than*. Begin by saying, "Six apples are fewer than seven apples." Ask children in turn to continue the sequence by saying, "Five apples are fewer than six apples," and so on.

LESSON OUTCOME

Recognize a set of eight; recognize and print the numeral 8; recognize the word *eight*

Materials

display board and cutouts, Unifix cubes; a sheet of paper for printing 8, a strip for printing 8 from copies of page T335, and an index card for each child

Vocabulary

eight

RELATED ACTIVITIES

- Have the children continue their number charts by drawing or pasting pictures of eight objects, printing 8 beside them, and pasting a strip of paper showing the word *eight* beside the numeral 8.
- Give each child eight toothpicks, a piece of paper, and glue. Have the children create shapes or patterns using the eight toothpicks.



Mark.

8 eight

Use a / to show sets of eight.

Print.

8	8	8	8	8	8	8	8
---	---	---	---	---	---	---	---

50 (fifty)

Recognizing sets of eight; printing the numeral 8

LESSON ACTIVITY

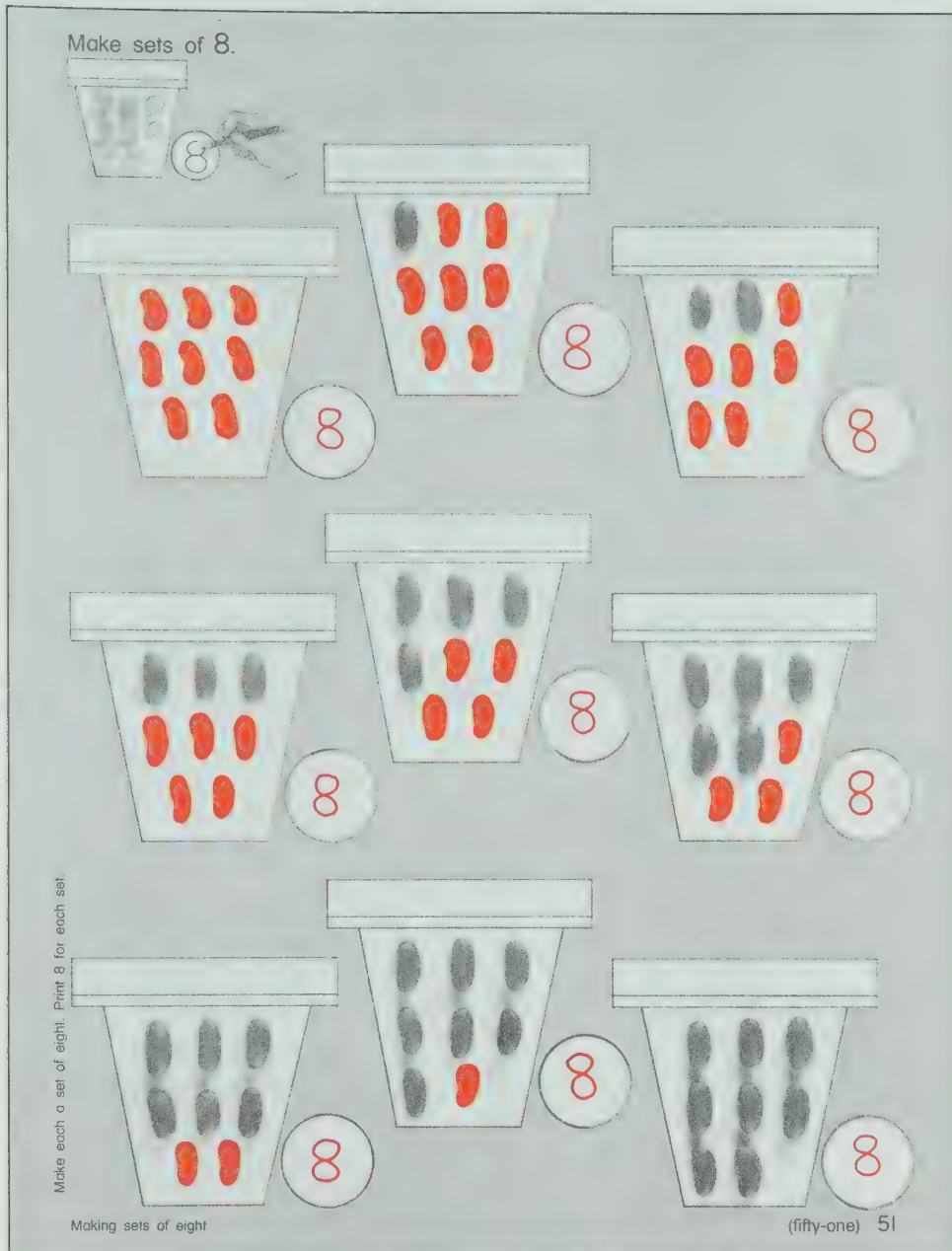
Before Using the Page

- Place cutouts, one at a time, in a row on the display board. After placing each cutout, ask a child to tell how many there are. Continue until there are seven cutouts. Include another one and introduce the word *eight*. Place the numeral 8 beside the cutouts. Ask one child to point to each cutout in turn and have the other children count from one to eight.
- Have children use Unifix cubes to make sets for one to eight. Ask the children to arrange the connected cubes according to their lengths (from shortest to longest).
- Draw a set of eight objects on the chalkboard. Ask how many objects there are in the set. Print the numeral 8 beside it, following the sequence shown on page 50. Have the children use hand and arm movements to form 8's in the air.
- Give each child a sheet of paper marked as shown. Have the children begin at the dot, follow the dashes, and stop at the star. You may wish to have the children use pipe cleaners or Plasticine to make 8's.



Using the Page

- Have the children count to find out how many white seeds there are in the set at the top of the page. Have them point to the numeral 8 and read the word *eight*.
- Have the children mark only the sets that show eight seeds. Remind them to count carefully before they decide to mark or not mark a set.
- Have the children trace over the two broken 8's and then practise on their own to complete the row. Give each child a strip for printing 8 from copies of page T335. When the children finish practising, ask them to print or paste their best 8 on the flower.
- After the children have completed the page, ask them to find the two sets that have only six seeds in each. Ask them how many flowers on the page show dark seeds.



LESSON OUTCOME

Complete a set to show eight members and show the number of the set

Materials

display board and cutouts, objects for counting, number tray, flash card for *eight*

RELATED ACTIVITIES

- Discuss things that come in eights, for example, arms on an octopus, legs on a spider. You may wish to draw the body of an octopus or a spider on the chalkboard and have the children copy and complete it by drawing eight arms or legs. Have them print the numerals in order from 1 to 8 beside the arms or legs.
- Have the children repeat this rhyme, which is useful for beginning counting by two's.

Two, four, six, eight
Mary at the cottage gate
Eating cherries off a plate
Two, four, six, eight.

LESSON ACTIVITY

Before Using the Page

- Place five cutouts on the display board. Ask a child to place another cutout to make a set of six and say, "Five and one are six." Ask another child to place another cutout and say, "Six and one are seven." Continue once more to make a set of eight.
- Have the children use small objects to make sets of eight. Have one child start with three objects, another with six, another with four, and so on. Ask the children to state how many they were given and how many more they needed to make sets of eight; for example, "I had three and I needed five more to make a set of eight."
- Draw a set of eight objects on the chalkboard. Ask how many objects there are. Print 8 beside the set and then the word *eight*. Emphasize that the numeral 8 and the word *eight* both tell how many objects there are in the set.
- Make a number tray for *eight* in the same way as for *zero* to *seven*. While the children watch, print the word *eight* on a slip

of paper or a label and paste it on the end of the number tray.

- Show a flash card with the word *eight* and use it several times during the day to strengthen recognition of the word. The children will be able to practise reading the word on page 52.

Using the Page

- Have the children count the yellow seeds shown in the small flower pot. Ask how many seeds were drawn and how many seeds there are in all when there are six seeds and two seeds.
- For each flower pot, have the children count the beans and then draw as many more beans as are needed to make a set of eight. Tell the children to check whether they have eight beans in each pot. As they check the number of beans in a flower pot, have them print the numeral 8 beside the pot.
- After the children have completed the page, discuss the beans in each flower pot by having children in turn make a statement about each one; for example, "There were four beans and I needed four more beans to make a set of eight beans."

LESSON OUTCOME

Determine the position of an object in relation to another; show the sequence of numbers from 0 to 8

Materials

display board and cutouts, yarn or string, clothes pins and line, number concept cards for 0 to 8, crayons for each child

Vocabulary

above, below

RELATED ACTIVITIES

- Create a dot-to-dot picture on a work sheet. Tell the children that they are to connect the dots in order beginning with the dot for 0 and ending with the dot for 8. As they join the dots, have them say to themselves, "Zero and one more is one," "One and one more are two," and so on.

Draw eight ●'s above the string. Draw eight ●'s below the string.

Mark. *Answers may vary.*

Use arrows to show a sequence.

Print.

52 (fifty-two)

Reinforcement of the numbers from 0 to 8

LESSON ACTIVITY

Before Using the Page

- Two words that are useful for later work in measurement and geometry are *above* and *below*. Play the game "Simon Says" with the children. Use statements like "Simon says, 'Place your hands above your head'" and "Simon says, 'Place your hands below your waist.'" Continue with statements involving "above" and "below" as related to other parts of the body and also to things in the classroom.
- Fasten a piece of yarn or string across the middle of the display board. Ask children to place cutouts above and below the yarn.
- Place sets of one, two, three, four, and five cutouts at random on the display board. Ask children to place strings to show the sequence, one, two, three, four, five. As the children place the strings in position, have them say, "From one to two, from two to three, from three to four, from four to five."
- Set up a clothes line in a convenient place. Attach nine clothes pins so that they are equally spaced on the clothes line.

Attach the number concept card for 0 to the first clothes pin on the children's left. Have children take turns attaching the number concept cards for 1 to 8 to the appropriate clothes pins. When the nine cards are in place, have the children count forward and backward.

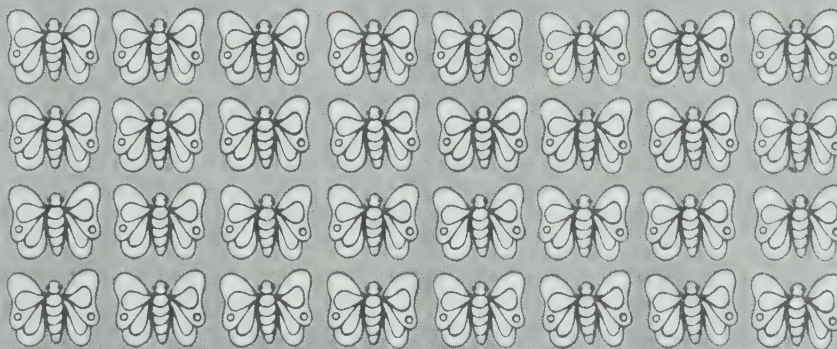
Using the Page

- Read the words with the children. Have them draw eight red beads above the string and eight green beads below it.
- For the second part of the page, have the children begin at the set of one in the upper left-hand corner and trace over the arrow to the set of one-and-one-more (two). Then have them find a set of two-and-one-more (three) and draw an arrow to it. (There are two such sets.) Have them continue in this way to find sets of four, five, and so on to eight. Then have each child try to find a second path from *one* to *eight* using a different color. You may prefer to have them use a work sheet showing the sets. Some children may wish to see how many different paths they can find.
- Have the children print the numerals in order for the last part of the page.

How many ?



Play the game.



Reinforcement of eight

(fifty-three) 53

LESSON ACTIVITY

Before Using the Page

- Place eight objects inside a hoop or a loop of string. Use a piece of yarn to separate the objects into groups of three and five. Ask children how many there are in each group and how many there are in the set. Rearrange the eight objects inside the set holder to show groups of four and four. Repeat the previous questions. Ask children to rearrange the eight objects in other ways (zero and eight, one and seven, two and six).
- Place six, seven, or eight objects inside a set holder. Ask children in turn to separate the objects into two groups; for example, a child may choose to separate six objects into groups of two and four. As the child does this, ask for the statement "Two and four are six." Repeat with other sets, but use sets of eight more often than the others.

Using the Page

- Ask the children how many insects there are on each side of the leaf. Have them trace over the 2 and the 6. Then have them complete the five other number combinations for eight.

OBJECTIVE

Demonstrate an understanding of eight

Materials

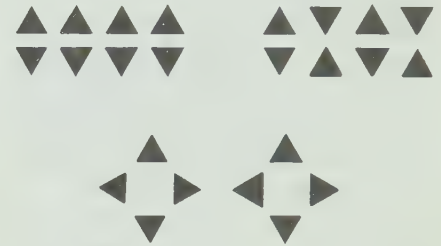
small objects for counters, hoop or loop of string for a set holder, yarn, special dice or condition cards, crayons for each child

RELATED ACTIVITIES

- Give each child a set of eight counters. Guide the children to use these when making a chart for *eight* that will show all the possible combinations for eight.

8
8 and 0
7 and 1
6 and 2

- You may wish to adapt for *eight* the second activity in *Related Activities* on page T64.
- Have the children make designs using eight gummed shapes.



- You may wish to have the children play the game "Numbers in Order" described on page T324.

- Use one of the two methods described on page T51 for playing the game. For Method 1, have the children play in groups of two or four, and mark the die to show 0, 2, 2, 4, 6, and 8 (0 means to color 0 butterflies, 8 means to color 8 butterflies). For Method 2, include new cards with conditions similar to the following:

1. If you are wearing something blue, color two butterflies.
2. If you have a brother or a sister, color three butterflies.

LESSON OUTCOME

Recognize a set of nine; recognize and print the numeral 9; recognize the word *nine*

Materials

display board and cutouts, small objects for sets of nine; a sheet of paper for printing 9, a strip for printing 9 from copies of page T335, and an index card for each child

Vocabulary

nine

RELATED ACTIVITIES

- Have the children continue their number charts by drawing or pasting pictures of nine objects, printing 9 beside them, and pasting a strip of paper showing the word *nine* beside the numeral 9.
- Give each child an index card to make a number concept card for *nine*.
- Adapt the matching activity for page 32 described on page T324. The numerals on the chart will be 6, 7, 8, and 9. The small cards will show the words *six*, *seven*, *eight*, and *nine*. Each child will need 30 small counters.

If you wish to extend the activity to include the numerals and word cards for 0 to 9, each child will need 45 counters. Each chart can be made from a large sheet of paper. The columns for 0 to 4 can be drawn on the upper half and the columns for 5 to 9, on the lower half of the sheet.

Mark.

9 nine

Print.

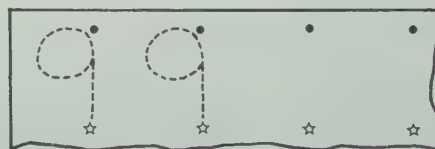
54 (fifty-four)

Recognizing sets of nine; printing the numeral 9

LESSON ACTIVITY

Before Using the Page

- Place cutouts, one at a time, in a row on the display board. After placing each cutout, ask a child to tell how many there are. Continue until there are eight cutouts. Include another one and introduce the word *nine*. Show the numeral 9. Ask a child to come and point to each cutout in turn while the rest of the class counts in unison, "One, two, three, four, five, six, seven, eight, nine."
- Place sets of from one to eight objects around the classroom. Ask children to include objects to make each set a set of nine. Have other children check the work by counting the objects in each set.
- Draw a set of nine objects on the chalkboard. Ask how many objects there are in the set. Print the numeral 9 beside it, following the sequence shown on page 54. Have the children use hand and arm movements to form 9's in the air.
- Give each child a sheet of paper marked as shown. Have the children begin at the dot, follow the dashes, and stop at the star.



Using the Page

- Have the children count to find out how many red beads there are in the set at the top of the page. Have them point to the numeral 9 and read the word *nine*.
- Have the children mark only the sets that show nine buttons. Remind the children to count carefully before they decide to mark or not mark a set.
- Have the children trace over the two broken 9's and then practise on their own to complete the row. Give each child a strip for printing 9 from copies of page T335. When the children finish practising, ask them to print or paste their best 9 on the paper bag.
- After the children have completed the page, you may wish to ask how many rows of large bags there are, how many large bags there are in each row, and how many bags there are in all.

LESSON OUTCOME

Complete a set to show nine members and show the number of the set

Materials

display board and cutouts, objects for counting, number tray, flash card for nine

RELATED ACTIVITIES

- Ask the children to listen while you tap on a table or desk from zero to nine times. Have the children tap on their desks to make nine taps altogether. For example, if you tap four times, the children tap five times. Have the children count aloud at first and silently later. You may wish to have pairs of children continue this activity by tapping, bouncing a ball, skipping a rope, using counters, or hopping on one foot.
- Adapt the game "Bingo" suggested on page T46 to cards having 16 squares. Give each child a blank card and 16 markers. Have each child print the numerals from 0 to 9 at random to fill all the squares. Select numbers using a spinner card showing from 0 to 9. The child who has four markers in a row first is the winner.



LESSON ACTIVITY

Before Using the Page

- Place five cutouts on the display board. Ask a child to place another cutout to make a set of six and say, "Five and one are six." Ask another child to place another cutout and say, "Six and one are seven." Continue until there are nine cutouts on display.
- Have the children use small objects to make sets of nine. Have one child start with four objects, another with seven, another with six, and so on. Ask the children to state how many they were given and how many more they needed to make sets of nine; for example, "I had four and I needed five to make nine."
- Draw a set of nine objects on the chalkboard. Ask how many objects there are. Print 9 beside the set and then the word *nine*. Emphasize that the numeral 9 and the word *nine* both tell how many objects there are in the set.
- Make a number tray for *nine* in the same way as for *zero* to *eight*. While the children watch, print the word *nine* on a slip

of paper or a label and paste it on the end of the number tray.

- Show a flash card with the word *nine* and use it several times during the day to strengthen recognition of the word. The children will be able to practise reading the word on page 56.

Using the Page

- Have the children count the beads in the small bag at the top of the page. Ask how many beads were drawn and how many beads there are in all when there are six beads and three beads. For each bag, have the children count the beads and then draw as many more beads as are needed to make a set of nine. Tell the children to check whether they have nine beads in each bag. As they check the number of beads in a bag, have them print the numeral 9 above the bag.
- After the children have completed the page, discuss the beads in each bag by having children in turn make a statement about each one; for example, "There were three beads and I needed six more beads to make a set of nine beads."

OBJECTIVE

Demonstrate an understanding of nine

Materials

display board and cutouts, crayons for each child

Vocabulary

between

RELATED ACTIVITIES

- Ask three children to stand in a row; for example, Bill first, Jan in the middle, and Mary last. Ask the children where Jan is standing. They may say “in the middle” or “second”, but try to lead them to say “between Bill and Mary”. Repeat with other groups of children.
- Have the children play the game “Team Up” described on page T324.

Draw.

nine ○'s between the pencils

Color.

How many are blue? How many did you color?

0	●	●	●	●	●	●	●	●	●	9
1	○	●	●	●	●	●	●	●	●	8
2	○	○	●	●	●	●	●	●	●	7
3	○	○	○	●	●	●	●	●	●	6
4	○	○	○	○	●	●	●	●	●	5
5	○	○	○	○	○	●	●	●	●	4
6	○	○	○	○	○	○	●	●	●	3
7	○	○	○	○	○	○	○	●	●	2
8	○	○	○	○	○	○	○	○	●	1
9	○	○	○	○	○	○	○	○	○	0

56 (fifty-six) Understanding nine

LESSON ACTIVITY

Before Using the Page

- Have children follow instructions involving the word *between*; for example, “Sue, stand between my desk and the window.” “Bill, place three pieces of chalk between the two books on the desk.”
- Place nine cutouts in a row on the display board. Move the one at the right end to the right to illustrate eight and one. Ask the children how many there are in each group. Record 8 and 1 on a chart.



Move another cutout to the right. Ask the children how many there are in each group and record 7 and 2 on the chart. Continue until all the combinations from 8 and 1 to 1 and 8 (or to 0 and 9, if you wish) have been recorded.

Have the children study the list of combinations and ask them questions such as: “If you have five pencils, how many more do you need for there to be nine pencils?” “If you have six pencils and someone gives you two more, do you have nine pencils?” Questions such as these are valuable in laying the foundations for addition and subtraction.

Using the Page

- Read the words at the top of the page with the children. Have them draw nine circles between the two pencils.
- For completing the chart, direct the children’s attention to the row with three blue shapes. Ask how many shapes are blue and then how many are white. Ask how many shapes there are in the row. Go to the first row and ask the same questions. Then go to the second row and ask the questions again. Have the children print the appropriate numerals on the left and right sides. When the children understand what to do, let them proceed on their own. After they print the numerals, have them color all the white circular shapes on the chart, say, red.

LESSON OUTCOME

Show number combinations for nine; show the sequence of numbers from 0 to 9

Materials

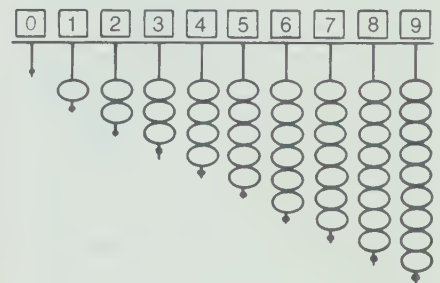
objects for counting, hoop or loop of string for a set holder, yarn, display board, large numeral cards for 0 to 9

Vocabulary

ring

RELATED ACTIVITIES

- Have the children string beads to show sets from zero to nine. Hang these for display and place numeral cards above the strings.



Have the children complete the work sheet described on page T83 for this page.

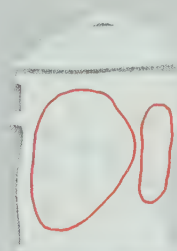
Ring.



5 and 4

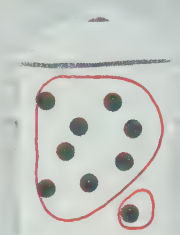


6 and 3



7 and 2

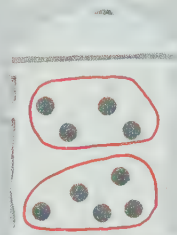
Make two sets from nine objects.



8 and 1



9 and 0

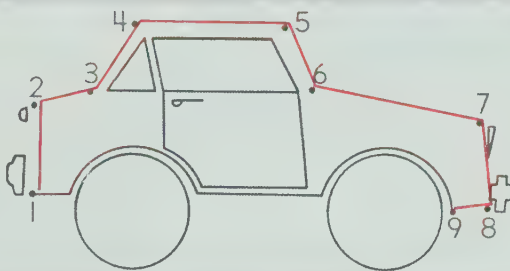


4 and 5

Print.

0 1 2 3 4 5 6 7 8 9

Draw.



Follow the dots.

Reinforcement of the numbers from 0 to 9

(fifty-seven) 57

LESSON ACTIVITY

Before Using the Page

- Place nine objects inside a hoop or a loop of string. Ask the children how many objects there are. Use a piece of yarn to separate the objects into groups of six and three. Ask children how many there are in each group and how many there are altogether. Have the children say, "Six and three are nine." Print the numerals 6 and 3 on the chalkboard. Pick up the yarn and ask one child to place it to show two different groups for nine. Repeat the previous questions and procedure. Continue until all the combinations for nine have been recorded.
- Place large numeral cards for 0 to 9 at random on the display board. Have children arrange the cards and say the numbers in sequence, both forward and backward. Then have children take turns, each printing one numeral on the chalkboard, to show 0 to 9 in sequence.
- Have the children take turns, each printing one of the numerals from 0 to 9 anywhere on the chalkboard. Make a dot beside

each numeral. Have other children help to join the dots, starting at 0 and continuing to 9 in sequence.

Using the Page

- Discuss with the children the number of yellow dots inside the first ring and the number of yellow dots inside the second ring. Ask how many yellow dots there are altogether. Have them trace over the 5 and the 4. Then have them count the green dots on the second garbage can. Ask if they can see a way to draw two rings to show another number combination for nine. After they have drawn the two rings, have them record the number of dots inside each ring. Remind the children that they are to show a different number combination for each garbage can. Let the children continue on their own.
- For the second part of the page, have the children print the numerals to 9.
- For the last part of the page, have the children begin at 1 and complete the dot-to-dot picture. After the children have completed the outline of the car, you may wish to have them color the car.

LESSON OUTCOME

Associate the number of a set with a location on the number line

Materials

plastic runner or floor tiles for a number strip from 1 to 9, number line with markers or magnets, number line for each child

Vocabulary

number strip, number line

RELATED ACTIVITIES

- Prepare a number line for each child according to the directions on page T83. It is essential that each child have a number line. Have the children use their number lines to answer questions as suggested in *Using the Page*.
- As a review of color and shape, you might have the children mark on the number line on page 58, according to directions similar to the following:
 “Draw a red ring around the numeral 4.”
 “Mark a blue X beside the number before 7.”
 “Draw a green square around the number between 2 and 4.”
 “Draw a yellow ring around each number after 6.”

Match.

58 (fifty-eight)

Introduction to the number line

LESSON ACTIVITY

Before Using the Page

- Using a plastic runner or floor tiles, make a number strip on the floor large enough for the children to step on.

1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---

Work with the children in groups of three or four. Have each child in turn begin by standing at the edge to start and then following directions such as: “Mary, move two steps on the number strip.” “Bill, move four steps on the number strip.” Continue until each child has had a turn.

- On the chalkboard draw a line with ten equally spaced dots indicating locations of numbers as shown below.



Ask one child to print a zero under the appropriate dot. Have other children in turn print numerals for the other numbers, taken in order. Erase the numerals and begin again with zero. Then take the remaining numbers at random. Have the children begin at zero and count aloud to find the locations of particular numbers.

- Place a number line on the display board and a marker at the dot that corresponds to zero. Ask one child to move the marker forward six steps. Ask another child to move the marker back two steps. Ask a third child to move the marker forward three steps. Continue this procedure until each child has had at least one chance to move the marker.

Using the Page

- Have the children draw lines to match each set with the appropriate dot on the number line for the number of the set. After the children have completed the page, you may wish to ask questions similar to the following:
 “Which number is one step after 3? one step before 7?”
 “Which number is between 3 and 5? between 7 and 9?”

How many ?

Show the number of cubes for each "train". Using Unifix cubes, put the "trains" in order.



LESSON OUTCOME

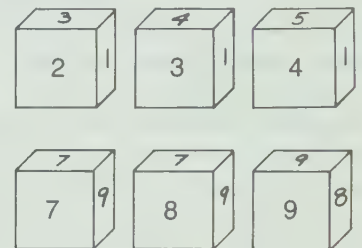
Order the numbers from 1 to 9 using linear models

Materials

interlocking Unifix cubes, cards with the numerals 0 to 9

RELATED ACTIVITIES

- Play the game "Block Spill". You will need three cubes with faces labelled 1 to 6, and three cubes with 7, 8, and 9 appearing twice on each. Choose one child to spill the cubes from a container, a second child to place them in order, and a third child to tell what numbers are missing (1, 5, and 6 are missing in the example below). If, for example, two 6's happen to show, simply place one behind the other or roll one of the cubes again.



- Have the children play the game "Fish" described on page T325.

Ordering the numbers from 1 to 9

(fifty-nine) 59

LESSON ACTIVITY

Before Using the Page

- Make a row of nine "stepping stones" on the floor. Label nine Unifix cubes with the numerals 1 to 9. Put the cubes in a container and have each of nine children draw a cube. Ask each of the nine children at random to stand on the appropriate "stepping stone". Ask other children to check that the nine children have matched themselves with the "stepping stones" correctly.
- Have each of nine children select a different number (from one to nine) of interlocking Unifix cubes and fasten them end to end to form a row. When the nine rows of cubes are laid out on a table, ask the children to decide how they should exchange their rows so as to arrange them from the shortest row to the longest row. Ask children in turn to place the appropriate card beside each row to identify the number of cubes.
- Give cards showing the numerals from 0 to 9 to ten children and ask them to form a row according to the order of the numbers.

Using the Page

- Have the children record the number of cubes used in each "train". After they finish this, have the children use cubes to make the "trains". Then ask them to put the "trains" in order from the shortest to the longest (from 1 to 9).
- If you do not have Unifix cubes, make a work sheet for this page. Have the children cut out the "trains" and paste them in order according to the number of "cars" in each. No matter what method you choose to use, this activity is of value for reinforcing ordinal number concepts.

LESSON OUTCOME

Demonstrate an understanding of the concepts *inside* and *outside* as they relate to geometric shapes

Materials

straws and pipe cleaners, D-Stix (optional), small objects, geoboards and rubber bands, four-by-four arrays of dots from copies of page T331

RELATED ACTIVITIES

- Have the children make shapes on geopaper and record the number of pegs that are inside and the number of pegs that are outside each shape. You may wish to have the children make shapes and then exchange them for recording the number of pegs that are inside and the number of pegs that are outside the shapes.
- If you have geoboards for all the children in the group, challenge them with questions similar to the following:
“Can you make a triangle with three pegs inside the triangle?”
“Can you make a shape with five pegs inside the shape?”
“Can you make a shape with zero pegs outside the shape?”
“Can you make a shape with four pegs inside the shape and four pegs outside the shape?”
“Can you make a shape that touches six pegs and has no pegs inside the shape?”

How many ?



pegs inside 4 pegs outside 8



pegs inside 1 pegs outside 7



pegs inside 1 pegs outside 6



pegs inside 2 pegs outside 6



pegs inside 4 pegs outside 6



pegs inside 2 pegs outside 8

60 (sixty)

Using *inside* and *outside* with geometric shapes

Count the pegs inside and the pegs outside each shape.

LESSON ACTIVITY

Before Using the Page

- Fasten three straws together with pipe cleaners to form a triangle, or use a commercial product such as the D-Stix. Discuss the fact that a triangle has three sides and three corners. Use other straws and pipe cleaners to form squares, rectangles, and other shapes having four, five, and six sides. Have the children count the sides for each shape.

Briefly review the concepts *inside* and *outside* with the children. (See pages T60 and T67.) Place the triangle on a table. Ask children to place small objects inside the triangle and outside the triangle. Repeat with the other shapes.

- If your geoboards have more than 16 pegs, mark off sections with 16 pegs in the way suggested on page T13. Place a rubber band to form a square having one peg inside it. Ask the children how many sides the square has. Have the children count the pegs inside the square and the pegs outside the square. Have the child trace along the sides of the square with a finger and count the pegs he/she touches. Refer to the pegs

touched as being used to form the square, or as being “part of” the square. Repeat for triangles, rectangles, and some shapes having five sides.

- Have the children make shapes on their geoboards according to your instructions; for example, “Try to make a shape with five sides. How many pegs are there inside the shape? How many pegs are there outside the shape?”

Using the Page

- Read the words on the page with the children. To help them recognize the words *inside* and *outside*, draw a large triangle on the chalkboard, print the word *inside* inside the triangle, and print the word *outside* outside the triangle.

If you have geoboards for all the children in the group, have them copy each shape on the page onto their geoboards and then record the number of pegs that are inside and the number of pegs that are outside the shape.

If you do not have geoboards, you may wish to have the children work directly on the page or you may choose to have them work on four-by-four arrays of dots from copies of page T331.

OBJECTIVE

Identify colors and recognize the numerals 1 to 9

Materials

nine cutouts of a clown prepared as described in *Before Using the Page*, crayons for each child

Vocabulary

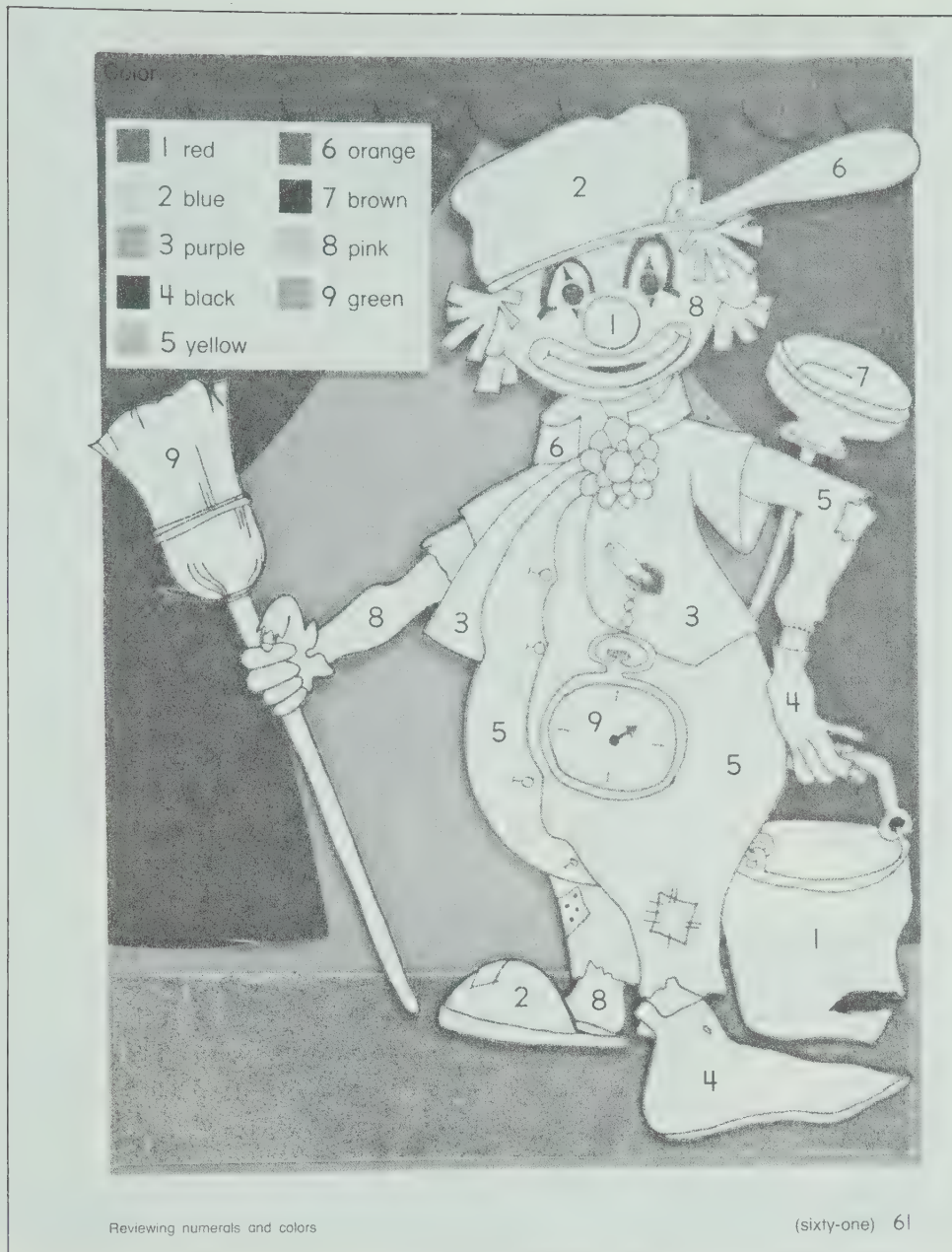
names of colors as shown on page 61

RELATED ACTIVITIES

- You may wish to have the children draw and color a picture of how they see themselves as a clown.
- Make a work sheet showing six rows and six columns of squares. Place the numerals from 0 to 5 in any order in the left-hand column. Have the children color the number of squares required for each row.

5					
1					
3					
2					
0					
4					

- Prepare a work sheet as shown on page T83 for each child. Have the children draw lines to match the set with the number of the set.



LESSON ACTIVITY

Before Using the Page

- Use colored paper to prepare nine cutouts of a clown, one for each color named on page 61. Print the numeral on each cutout to correspond to the numerals given for the colors. Use the cutouts for the following activities:

- Have children arrange the cutouts in order from 1 to 9.
- Name a number and ask a child to identify the color.
- Name a color and ask a child to identify the number.
- Give one cutout to each of nine children. Have all the children sing the following words to a simple tune.

“Blue clown, blue clown,
What do you see?”

The child holding the blue cutout should respond using a similar tune and choosing a different color for the response, for example,

“I see a red clown
Looking back at me.”

Have all the children sing the original question for the color

red. The child holding the red clown responds for another color. After a few rounds, have a different group of children hold the cutouts for the activity.

Using the Page

- Discuss the colors and their names with the children. Ask which color is associated with each of the numerals 1 to 9. Have the children look at the picture of the clown and identify things that are to be colored a particular color.

As the children color their pictures, encourage them to work neatly. After they finish coloring the clown, read the following poem to them.

The jolly old clown
Is funny and gay.
He laughs and sings
In the merriest way.
Of all the others
That are known to me,
A clown is what
I would like best to be.

Mary Catherine Rose

OBJECTIVE

Demonstrate an understanding of the numbers zero to five

Materials

number trays for *zero* to *five*, overhead projector, counters for each child

RELATED ACTIVITIES

- You may wish to have the children engage in Mathematics Activity 2 suggested on page T54.
- Use counters on the overhead projector to display sets having from zero to five members and ask children to tell how many there are in each set. Encourage recognition of the numbers by pattern rather than by counting. This can be done by turning the projector light off as you arrange the counters for the set, and then flashing the light on for one or more seconds, according to the difficulty desired. Display a variety of patterns where possible.



How many ?

3	5	2
4	0	1

Make sets.

3	2	0
4	5	1

62 (sixty-two)

Reviewing sets of zero to five

LESSON ACTIVITY

Before Using the Page

- Display the number trays for *zero* to *five*. Have children place the appropriate number of objects in each tray and then arrange the trays from the least number to the greatest number. Ask the children to count from 0 to 5 and from 5 to 0.
- Show sets of from zero to five counters on the overhead projector and ask children to tell how many there are in each set. Then name a number from 0 to 5 and ask the children to show the corresponding number of counters.
- Place two counters on the overhead projector and ask the children to use their counters to make a set having the same number. Then ask them to place more counters in their set to make a set of five. Ask how many more counters were needed. Use other similar examples.

Using the Page

- For the first part of the page, read the words "How many?" and elicit from the children that they are to show how many beans there are in each set.

- For the second part of the page, read the instruction "Make sets" and discuss with the children that they are to draw beans to match the number shown for each set. As they complete each set, have them count to check that their work is correct.
- After the children have completed the page, direct their attention to the six sets of beans at the top of the page and ask questions similar to the following:
 - "Are there more beans in the first set or in the third set?"
 - "Are there more beans in the third set or in the fourth set?"
 - "Are there fewer beans in the second set or in the fifth set?"

OBJECTIVE

Demonstrate an understanding of the numbers six to nine

Materials

the number trays for zero to nine, overhead projector, counters and crayons for each child

RELATED ACTIVITIES

- Prepare a work sheet as shown on page T83 for each child. Check that the puzzle is correctly positioned before you begin. The puzzle contains every number strip from one to nine hidden in just one possible location. Ask the children to find where the *three* strip is hidden (upper right corner). Have the children print the numerals 1, 2, 3 in the squares, to indicate the *three* strip. Have the children cross out the word *three* to indicate that this strip has been found. Tell them that the 1 is the start of another hidden number strip. Ask them what strip they think it might be (seven). Have them print the numerals in the squares and cross out the word. Continue until the nine strips have been found.

How many?

Make sets.

Reviewing sets of six to nine

(sixty-three) 63

LESSON ACTIVITY

Before Using the Page

- Display the number trays for zero to nine. Have children place the appropriate number of objects in each tray and then arrange the trays from the least number to the greatest number. Ask the children to count from 0 to 9 and from 9 to 0.
- Show sets of from six to nine counters on the overhead projector and ask the children to tell how many there are in each set. Then name a number from 6 to 9 and ask the children to show the corresponding number of counters.
- Place four counters on the overhead projector and ask the children to use their counters to make a set having the same number. Then ask them to place more counters in their set to make a set of seven. Ask how many more counters were needed. Repeat several times for the numbers from six to nine.

Using the Page

- Ask a child how many green beads there are in the first set. Have the children check the answer by counting aloud. Then

have them work independently and record the number for each of the six sets.

- For the second part of the page, ask the children to draw as many round shapes as are required to match the number shown for each set. As they complete each set, have them count to check that their work is correct. Ask them to color red all the shapes that they drew.

- After the children have completed the page, ask the following questions:

“How many green shapes are there in the first set? How many red shapes are there? How many are one and five?”

“Look at the third set. How many yellow shapes are there? How many red shapes are there? How many are four and two?”

Continue with other similar questions for the numbers seven, eight, and nine.

OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

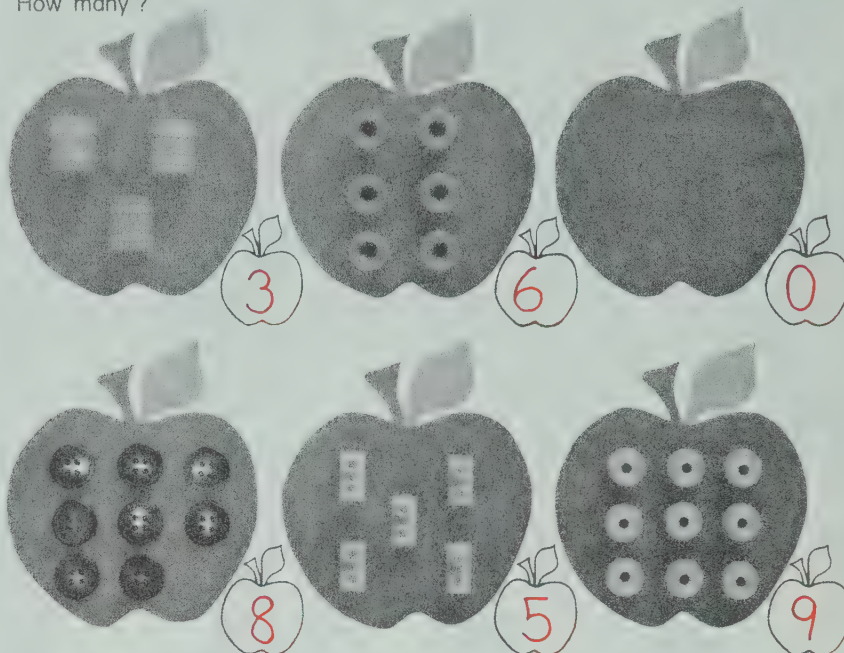
RELATED ACTIVITIES

- For children who need more practice in recognizing numerals and patterns, have them work with their counters and their number concept cards. Have the children use counters to make a pattern for a number. Then ask them to place the appropriate card beside the counters.
- This would be a suitable time to introduce the children to the counting device "elevator beads" described on page xxxi. Because there are ten beads in each set, the children would have an informal experience in counting to ten and in showing sets with up to ten beads. This device will also be useful in developing addition concepts in Unit 4.
- The activity described for this page on page T325 will reinforce cardinal number concepts and prepare for the work of addition and subtraction in Unit 4 and Unit 5.

Print.

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

How many?



Make sets.



64 (sixty-four)

CHECKUP

LESSON ACTIVITY

Before Using the Page

- Page 64 is a review of number concepts presented in Unit 2 and Unit 3. It is unlikely that preliminary work will be necessary because the exercises on page 64 are similar to those on pages 62 and 63. However, you may wish to adapt some of the activities suggested for these lessons for a quick review prior to assigning the page.

Using the Page

- Draw attention to the word *Checkup* at the bottom of the page. Have the children recall that such pages review work they have taken and help them to determine their understanding of that work.

Point to each of the three instructions in turn and, if possible, have a child read and/or interpret what is required. Then let the children work independently. Remind them to count to check that their work is correct.

- After the children have completed the page, you may wish to ask questions similar to the following:

- "How many red apples are there on the page?"
- "How many of the red apples show yellow counters?"
- "Which set of yellow counters has more counters?"
- "Are there more buttons or more blue beads?"
- "Are there fewer green beads or fewer buttons?"
- "How many counters are there in the first row of red apples?"
- "How many counters did you draw for the first apple?"
- "How many counters did you draw for the second apple?"
- "Did you draw more counters for the first apple or for the second apple?"

Games and Activities

Poem for page 41

Five little mice came out to play,
Gathering crumbs up on their way;
Out came a pussycat
Sleek and black –
Four little mice went scampering back.

Four little mice came out to play, etc.

Poem for page 41

Five little pussycats playing near the door;
One ran and hid inside and then there were four.

Four little pussycats underneath a tree;
One heard a dog bark and then there were three.

Three little pussycats thinking what to do;
One saw a little bird and then there were two.

Two little pussycats sitting in the sun;
One ran to catch its tail and then there was one.

One little pussycat feeling like a hero;
It chased a butterfly and then there were zero.

Poem for page 42

Five little sparrows sitting in a row;
One said, "Cheep, cheep, I must go!"
One little, two little,
Three little, four little,
Five little sparrows – Oh.

Four little sparrows sitting in a row, etc.

Three little sparrows sitting in a row, etc.

Two little sparrows sitting in a row, etc.

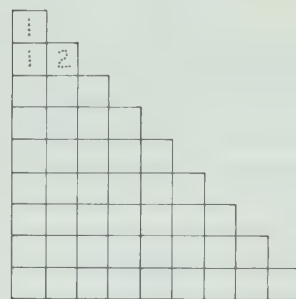
One little sparrow left in the row
Said, "Oh, dearie me, what shall I do?"
One little, two little,
Three little, four little . . .
"Cheep, "I'll fly away too."

Linda Chesterman

Activity for page 57

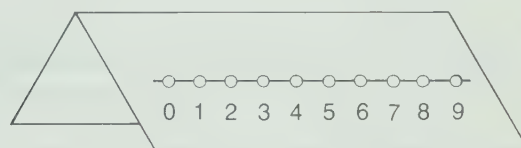
Prepare a work sheet showing number strips from one to nine as indicated. Have the children complete the chart by printing 1 in the frame for the *one* strip, 1 and 2 in the frames for the *two* strip, and so on.

You may wish to have the children complete the chart by using a spinner to indicate which strip they are to fill in. The children may work in pairs, the winner being the child who first completes the chart.

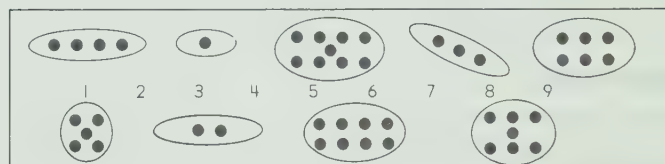


Individual Number Lines (for page 58)

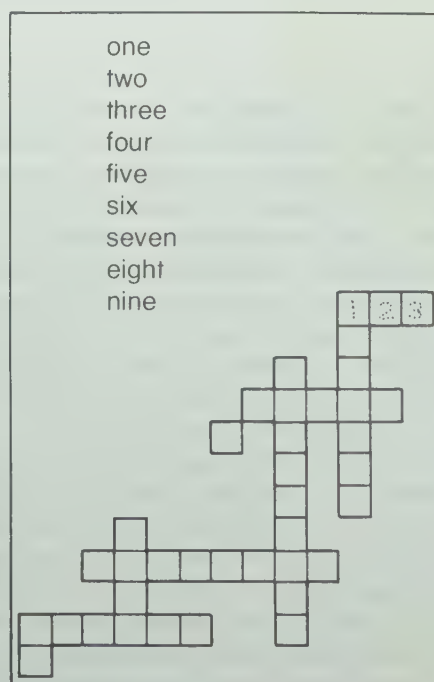
Fold a piece of cardboard in half so that it will stand as shown. Draw a number line on one side. Above each numeral punch a hole large enough for a drinking straw to be inserted. Each child will need five drinking straws cut in half. Have each child respond to a particular question by placing a straw in the appropriate hole.



Worksheet for page 61



Worksheet for page 63



Unit 4 Overview

Addition of two numbers is presented in this unit by relating the operation to the action of joining two sets. Interesting illustrations are used to ensure a meaningful development of the process. Children read and write number sentences for sums to 9 using the symbols $+$ and $=$. Counting is used to determine which of two sets contains more or fewer members and this leads to identifying numbers that are greater than or less than a given number. The number line is used to reinforce these concepts and to identify the number that is between two numbers. The terms *heavier than* and *lighter than* are associated with the masses of familiar objects and the terms *fastest* and *slowest* are applied to describe comparative speeds. A review of geometric figures is included in a lesson involving making pictures and patterns by combining two-dimensional shapes. Since the major topic in the unit is addition, the *Checkup* tests the children's understanding and use of this operation.

Unit Outcomes

Number

- identify numbers greater than or less than a given number
- make sets with one, two, or three more members than a given set
- join sets and relate the action to addition of numbers
- recognize and interpret the words *plus* and *equals* and the symbols $+$ and $=$
- write number sentences to show addition, sums to 9
- complete addition sentences for sums to 4
- illustrate addition sentences for sums to 9

Measurement

- compare objects with respect to mass
- use the words *fastest* and *slowest* in relation to movement

Geometry

- combine two-dimensional shapes to make pictures and patterns

Background

Number: In determining which of two sets has more members, the children have progressed from using the method of one-to-one matching to that of counting the members in the sets. During this development it is probable that the children acquired notions of the relative sizes of numbers. In this unit, children are encouraged to move gradually to the abstract level of thinking about numbers and know which of two numbers is greater than or less than the other without depending on one-to-one matching or on counting. To know that six is greater than five indicates that these concepts have reached the abstract level in the mind of the learner.

It is important that the correct mathematical vocabulary be used when talking about numbers at the abstract level. The words *more* and *fewer* are used in connection with objects; for example, if set A has 5 beads and set B has 3 beads, then set A has more beads than set B. The terms *greater than* and *less than* are used in connection with abstract numbers; for example, 5 is greater than 3, and 3 is less than 5. Some children will confuse these words as they move from concrete to abstract

levels of thinking. The teacher's use of the proper vocabulary should guide the children in the correct usage of the terms, rather than formal teaching.

The symbols $>$ and $<$ for "is greater than" and "is less than" have not been included in Book 1 because it is felt that symbolism introduced too early confuses children. Instead, there is an emphasis on understanding number concepts and the operations of addition and subtraction with a minimum amount of symbolism. The symbols $+$ and $=$ are required for the number sentences developed in this and subsequent units, but the symbols $>$ and $<$ will appear for the first time in Book 2.

The activities involving sets having one more, two more, or three more members than a given set provide an informal and concrete approach to addition. Children may perceive incidentally that the number of the final set is greater than the number of the first set because of the extra members. In the *Related Activities* suggested for these lessons, the children are encouraged to think and react on an abstract level and respond with statements such as "Four (blocks) and two more (blocks) are six (blocks)." Some children may need to use concrete materials and they should be encouraged to do so, rather than risk acquiring incorrect number ideas through guessing.

The operation of addition, which uses only abstract numbers, is related to the joining (union) of sets as long as no member belongs to both sets. By joining two sets and counting all the members, children can discover the sum of two numbers. Again, encourage the use of the correct terms when moving from concrete to abstract levels. The word "join" is used with sets: "Join the set of red beads and the set of blue beads." The word "add" is used with numbers: "Add 5 and 3."

After the numerals 0 to 9, the next symbol the children learn is $+$, the symbol for addition, which is read "plus", not "and". Children are provided with many opportunities to respond to the sign $+$ and learn to associate it with the joining of sets and addition of numbers. For example, if the addition phrase $2 + 3$ is shown, children make a set of two and a set of three and join them.

The next symbol to be introduced is $=$, the symbol for equality and referred to as the equals sign. Children are led to see that the number expressed on one side of the equals sign is the same as the number on the other side, although the forms may be different. For example, in the addition number sentence $3 + 4 = 7$, $3 + 4$ is one way of indicating seven, and the standard numeral 7 is the shortest way of doing so.

Prior to the introduction of the symbol $=$ on page 75, children are encouraged to make statements such as "Two plus three is the same as five." Perhaps this sounds wordy, but the meaning of the symbol $=$ is emphasized by the two different names for the same number. Eventually, the statement is shortened to "Two plus three is five." A statement such as "Two and three are five" is a carryover from the concrete level of joining sets and should be avoided when the number sentences refer only to the abstract numbers.

Measurement: Children are introduced to terms that relate to comparison of *mass*. The term *weight* is probably more familiar than mass, but the two terms are not the same. Although the children should not attempt to make a distinction between these two terms, the teacher should be aware of their correct usage. Briefly, mass refers to the quantity of matter in an object. Weight is the measure of force required to lift or support an

object. This force is dependent on the influence of gravity and thus the weight of an object can vary, whereas its mass cannot. Mass is measured on balance scales with the object on one side and standard units of mass on the other. Since the force of gravity is the same on both sides of the balance scales, the mass can be determined accurately. The weight of an object is measured by a spring balance and both the mass of the object and the force of gravity affect its weight. In this unit, no reference is made to mass; the experiences require children to pick up objects and describe them only as being *lighter than* or *heavier than* other objects.

The indefinite terms *fast* and *slow* are relative terms. A movement is considered to be fast by comparing it with another movement that is slower or by using a standard measurement of speed. A discussion of these terms is initiated on a basis more personal to the children. They decide, for example, whether walking or running is preferable under certain conditions and give reasons for their decisions. Later, discussions are directed toward different methods of transportation and comparing the speeds at which different animals can move. In this unit, only the terms *fast*, *faster*, *fastest* and *slow*, *slower*, *slowest* are used.

Geometry: The two-dimensional shapes and their names (circle, rectangle, square, triangle) are reviewed. Children create patterns and designs by tracing around blocks and other objects having these four shapes.

Teaching Strategies

If the children's different rates of progress in the first three units have required the formation of faster-moving and slower-moving groups, these groups should be retained for most of the lessons in Unit 4. Because a solid base of number concepts and skills in counting is required before the operation of addition is presented, small-group instruction is suggested to provide the necessary foundation and an appropriate approach to the new topic. However, instructional groups should be kept flexible and should be changed according to the nature of the topics and the abilities of the children. For instance, large groups or different groups could be used with lessons on mass and movement because these topics are not dependent on number concepts. The lesson in which geometric shapes are reviewed requires no specific grouping by ability, but the number of shapes available may determine the grouping necessary.

In connection with the lessons that deal with mass, a table might be set up having a variety of light and heavy objects. Children should have opportunities to feel how heavy or light the various objects are and to compare them. Activity cards or work sheets could suggest comparisons and provide ways for the children to record their findings.

Materials

- display board and cutouts
- items for making sets, devices for set holders
- yarn or string for matching one to one
- counters for each child
- number concept cards for 0 to 9 for each child
- number line for demonstration
- a number line for each child (See page T83.)
- balls for bouncing a given number of times

- flash cards showing the word *plus* and the word *equals*
- attribute blocks or suitable substitute
- pictures of fast-moving and slow-moving animals
- bricks, stones, balloons, objects suitable for comparing masses
- objects shown on pages 80 and 81
- paper cups with covers, sand, flour

Vocabulary

greater than	slowly
less than	fast
join	faster
complete	fastest
plus (+)	slow
add	slower
addition	slowest
equals (=)	heavy
number sentence	heavier than
addition sentence	light
quickly	lighter than

Unit 4 Theme – Animals

The purpose of this theme is to provide an introduction to the animal world. The activities are designed to develop an awareness in the children of the habits and habitats of various species of animals by using such skills as observation and comparison.

Set up a display to encourage interest in animals. Place mounted pictures of animals on the wall. Arrange books about animals on a table. Include picture books and simple story books, as well as books to be read to the children. Provide plastic models of animals that the children may handle. Simple animal puzzles and teacher-made activities may also be included in the display.

LANGUAGE ACTIVITIES

Plan periods during which you can read to the children from the animal books. This will provide the necessary input of information for discussion in the activities suggested for the other subjects as well as the language activities.

1. Names of Animals

Have the children tell the names of all the animals they know. Record the names on a sheet of chart paper labelled "Animal Names We Know". This will be a reference chart for subsequent activities.

2. Habitats of Animals

Have the children name the kinds of places where animals live naturally. Lead the children to suggest such environments as home, farm, field or meadow, forest, jungle, the Arctic. Label a sheet of chart paper for each environment. Read the names from the previous chart and record these on the charts as the children assign each animal to its proper environment.

3. Nursery Rhymes and Poems

Many nursery rhymes and simple poems have been written about animals. Make a list of the ones that the children know. Some of these may be

- "Mary Had a Little Lamb"
- "Three Blind Mice"
- "Hickory, Dickory, Dock"
- "Hey, Diddle, Diddle"
- "This Little Pig Went to Market"
- "Alligator Pie"

Repeat the rhymes for the benefit of those children who may not know them.

Choose a rhyme with a clearly defined rhythm. Have the children repeat the rhyme while clapping the rhythm. When the rhythm is established, have the children repeat the rhyme three times while clapping the rhythm pattern but speaking more softly each time.

Choose one or more rhymes that can be acted out. Assign roles to various children and have them act out the rhymes while the remaining children chant.

4. Writing About Animals

By now the children will have learned a great deal of factual information, and vocabulary will be available from charts of previous activities in all subject areas. Make a list entitled "Things We Know About Animals". Some of the ideas elicited from the children may be where animals live, what

animals eat, animal coverings, how animals protect themselves.

Have each child select an animal, draw a picture of the animal, and record at least two things that he/she knows about the animal.

5. Animal Families

Have the children collect the names of animals and their young. Record the names as suggested below.

Animal	Young
cat	kitten
dog	pup
cow	calf
horse	foal
hen	chicken
bear	cub

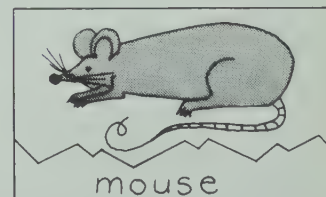
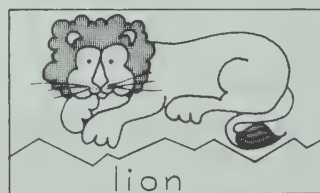
Encourage the children to suggest names to add to the list from time to time in an effort to include as many names as possible.

6. Message to Pet Owners

Help the children write a radio or a television announcement of about fifty words urging people to be kind to their pets. One child may be chosen to read the message to the class or even over the school's public address system. You may wish to have each child print a copy of the message to take home.

7. Animal Puzzles

Print the name of an animal at the bottom of a card measuring about 12 cm by 20 cm. Paste a picture of the animal at the top of the card. Cut the card between the picture and the name to make a puzzle. Make as many of these puzzles as you wish. Shuffle the pieces of the puzzles and have the children find the name that corresponds to each picture.



MATHEMATICS ACTIVITIES

1. Classification

Using the list of animals from Language Activity 1 and the plastic models of animals, have the children sort the animals in different ways. If plastic models are not available, pictures can be used. Some ways of having the children classify the animals are as follows:

- wild / tame
- large / medium / small
- heavy / light
- brown / black / gray / white
- lives on land / lives in water
- lives in a warm region / lives in a cold region

2. More Than – Fewer Than

Make several charts on Bristol board, showing groups of animals on the left-hand side. Draw a ring as a set holder on the right-hand side. Label each chart “More Than” or “Fewer Than”. If you wish, protect each chart with acetate.

Have the children use the plastic models or picture cards to make appropriate sets opposite each group of animals.

3. Lighter Than – Heavier Than

You will need several sets of balance scales for this activity. Prepare at least six envelopes, each containing two sets of plastic animals, for example, four pigs and six horses.

Have the children predict which group will be heavier than or lighter than the other. Then have them verify their predictions on balance scales. Have the children record the information on a work sheet by filling in blanks; for example,

“The _____ are heavier than the _____.”

You may prefer to have each child record the whole sentence.

4. Fast and Slow

Discuss with the children the ways in which animals move. Encourage the use of such words as *trot*, *gallop*, *run*, *creep*, and *bound*. Suggest that some animals are fast and some are slow. Have the children classify the animals from Language Activity 1 in this way.

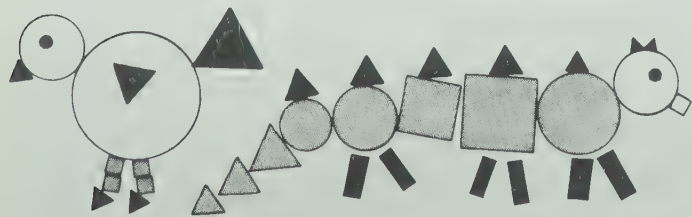
Ask the children why some animals need to be fast. Try to create some insight into the relationship between speed and protection and survival.

5. Solving Problems

Have the children use sets of plastic animals to illustrate joining situations that you describe. Also, have them describe situations that you illustrate using the plastic animals. For example, if you place two plastic horses on a table and bring another plastic horse toward them, a child should give a response similar to the following: “There were two horses. One more horse came to join them. Now there are three horses.”

6. Geo-Shape Animals

Provide children with geometric shapes (squares, rectangles, triangles, and circles) of various colors. Have the children paste the shapes on sheets of paper to form real or imaginary animals. The children may name their animals and then draw and color a background.



SCIENCE ACTIVITIES

1. Animal Habitats

Discuss the habitats of some of the animals suggested in Language Activity 2. Discuss how one environment is like or

different from another. The following are some suggestions that the children may make:

- Both the jungle and the forest have trees, but the trees in the jungle have thicker leaves and are often covered with vines.
- The jungle is very hot, whereas the Arctic is very cold.
- A home is safe and warm for pets, but animals of the field must look after themselves.

When the children understand the various environments, choose four to be illustrated. Divide the class into four groups and have the children in each group illustrate one of the four environments. The illustrations may be individual paintings to make a book, or they may be murals made by cutting colored paper. A short story on chart paper might accompany each set of pictures or each mural.

2. Physical Attributes

A visit to a zoo would be ideal at this time. If this is not possible, a film on wild creatures would be satisfactory. Colored photographs or slides would also be acceptable.

As the children view the animals, direct their attention to the physical attributes peculiar to each animal. Have the children suggest why each animal has these attributes and how they help or hinder the animal.

3. Animal Coverings

Use the previous activity as a reference for this activity. Discuss with the children the various body coverings on the animals. This is a difficult concept without the aid of touch, but most children will be able to deduce this information from pictures. Have the children classify the various coverings, such as fur, hair, skin, and wool. Discuss the fact that these coverings are necessary for protection and warmth according to the environment and the activity of the animal.

4. Animal Feet

Have the children recall the discussion of how animals move from Mathematics Activity 4. Ask the question: “How are an animal’s feet designed to help it move in a certain way?”

Investigate other questions such as the following:

- “Which animals have claws? Why?”
- “Which animals have hooves? Why?”
- “What does a paw usually look like?”
- “Which animals have feet that look like hands?”
- “Which animals have huge, clumsy-looking feet?”

SOCIAL STUDIES ACTIVITIES

1. Animal Babies

Show pictures of animals and their young to the children. Compare how people and animals care for their young. Have the children decide which characteristics are similar and which are different. For example, parents teach children how to look after themselves, how to dress themselves, how to cross streets, and how to play games; animals teach their young how to look after themselves, how to hunt for food, how to hide from their enemies, and how to keep warm and safe.

2. Animal Homes

Discuss the kinds of homes in which people live. Establish the common elements of human homes, for example, several rooms (often many), lighted and warm rooms, furniture for comfort, machines to do work.

Have the children name some animal homes they know. Lead the children to see that animal homes are varied and often simple. Many animals live in the open, or in holes in the ground or in trees. The beaver is a notable exception. Introduce the children to the complexities of a beaver lodge.

3. Coloring for Protection

Refer to Science Activities 2 and 3. Discuss the various colors of the animals' coverings. Ask questions similar to these:

"What color is seen most often? Why?"

"Which group of animals are mostly brown?"

"How does color protect an animal?"

"Why is a polar bear white?"

"Why are some animals' coverings a mixture of colors?"

"Which animals have coats that are a mixture of colors?"

4. Nature's Way

Discuss with the children why the young of wild and tame animals are born in the spring. Have the children find out how old various animals must be before they can leave their mothers and go to live on their own.

ART ACTIVITIES

1. Animal Mural

A mural is an exciting way for children to share their knowledge. The children can make imaginative three-dimensional animals by using rolls of construction paper of various lengths. Two long sections bent over a "body" roll will form legs. Another roll inserted in the "body" and bent up or down will form a head.

The background of the mural can be painted or covered with torn paper. Trees can be made by using the rolled-paper technique for trunks, and green leaves can be glued on the top of each trunk.

2. Thumb-Print Animals

Spread a thin coat of washable ink or paint over the ball of your thumb. Press your thumb on paper so that the print of the thumb is well-defined. Show the children how to draw an animal, using a thumb print as part of the body as in the examples shown below.



Encourage the children to make a collection of their drawings of animals based on thumb prints.

MOVEMENT ACTIVITIES

1. Heavy Movement

Have the children imagine they are large, heavy animals. Have them pretend to move through various places, such as a forest, a river, and a jungle. Have the children demonstrate how they will move around obstacles and whether they will move quickly or slowly.

2. Light Movement

Have the children name small, light animals. Have them imagine themselves to be one of these animals. Have them

demonstrate how they move on the ground and through the trees. Discuss how this movement is different from that of large, heavy animals. Discuss whether these small animals make any sounds as they move and whether they move quickly or slowly.

3. Obstacle Course

Place a number of obstacles of various heights around the gym, such as benches, boxes, balls, and beanbags. Have some children pretend to be heavy animals; and others, light animals. Have the children move around the obstacles in the ways that the animals chosen would move.

4. True or False

Have the children line up in the gym in rows and columns about a metre apart. Stand in front of the group and make a series of statements concerning wings; for example, "Birds have wings," "Cats have wings," "Pigs have wings," "Robins have wings," and so on. Flap your arms as you make each statement. The children are to flap their arms if the statement is true, and leave their arms at their sides if the statement is false.

5. What Animal Am I?

Have the children sit in a large circle. Whisper the name of an animal to one child who goes to the centre of the circle and pretends to be that animal. The other children try to guess what animal is being portrayed. The actor must not speak but may nod the head to indicate yes or no. The child who guesses the name of the animal may move to the centre of the circle and pretend to be another animal.

MUSIC ACTIVITIES

1. Animal Sounds

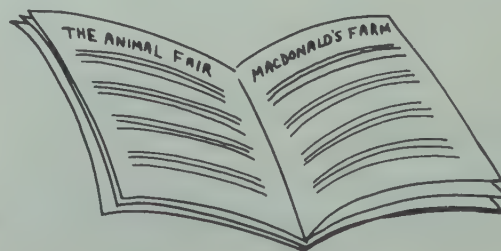
Refer to the farm animals listed for Language Activity 2. Have the children demonstrate the sound each animal makes. Using a simple tune, compose a song about the farm animals. Compose a verse for each animal and include the sound that the animal makes.

2. Old MacDonald Had a Farm

Have the children sing this popular song, which follows the previous activity quite naturally. After the children have sung the song together, assign an animal to each group of six children. As the children sing the song again, have those in each group make the sound of the animal assigned to them when that part occurs in the song.

3. Animal Song Book

List with the children the names of all the animal songs they know. Make a class book entitled "Animal Songs We Know". Play the record "One Elephant, Deux Elephants" to provide more names of animal songs and to let the children enjoy animal songs that they may not have heard before.



Unit 4

Ring.

Ring the set that has more than the other.

Mark.

Use a ✓ to show the set that has fewer than the other.

Reviewing the concepts more than and fewer than

(sixty-five) 65

LESSON OUTCOME

Count to determine which of two sets contains more or fewer members than the other

Materials

display board and cutouts, yarn or string, small objects for making sets, nine counters for each child

RELATED ACTIVITIES

- Divide the class into two teams. If there is an odd number of children, one child will play twice. In a bag place popsicle sticks on which zero to nine gummed stars have been pasted. Provide as many sticks as there are children playing the game. The first child on each team draws one stick from the bag and counts the stars on it. The child with the stick that has fewer stars wins both sticks for her / his team. If the two sticks have the same number of stars, the sticks are returned to the bag and the players take another turn. Play continues until each child has had a turn and / or all the sticks have been won.

LESSON ACTIVITY

Before Using the Page

- Review the concepts *more than* and *fewer than*, using some of the suggestions given on pages T20 and T21.
- Place a set of three cutouts and a set of four cutouts on the display board. Have children place pieces of yarn or string to match the objects one to one. Have them tell which set has more objects and which set has fewer objects than the other. Repeat this activity several times.
- Because the children have experienced counting to nine, they can begin to use the numbers of sets for determining which of two sets has more (fewer) members. Place a set of four cutouts and a set of five cutouts on the display board. Instead of having the children use yarn or string to match the objects one to one, have them count the objects in each set and tell which set has more (fewer). Ask why the set has more (fewer). Encourage the response that five objects is one more than four objects (four objects is one fewer than five objects). Repeat the activity several times with other sets of objects.

- Have the children take turns making pairs of sets of small objects, counting how many there are in each set, and indicating which set has more (fewer).
- Display a set of objects. Have the children use their counters to make a set that has more (fewer). Repeat for other sets.

Using the Page

- Discuss with the children the worked example at the top of the page. Ask which set has more animals. Have the children trace over the ring showing the set that has more. Then have the children ring the set in each of the other three pairs that has more.
- For the second part of the page, ask which set in the worked example has fewer animals. Have the children trace over the check in the worked example. Then have the children check the set in each of the other three pairs that has fewer.
- After the children have completed the page, you may wish to have them consider all the sets on the page that are unmarked and decide whether a ring or a check would be appropriate. Each set could be marked accordingly.

LESSON OUTCOME

Identify which of two numbers is greater than the other

Materials

small objects, string, display board and cutouts, number concept cards and nine counters for each child

Vocabulary

greater than

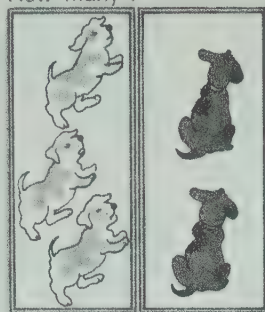
Background

For comparison of sets of objects, the terms *more than* and *fewer than* are used. For comparison of numbers, the terms *greater than* and *less than* are used. If some children substitute "more" for "greater" or "less" for "fewer", accept their responses, but make an effort to use the correct words yourself.

RELATED ACTIVITIES

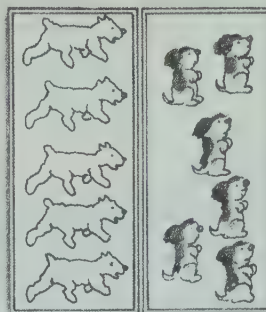
- Have the children work in pairs. One child uses counters to form a set and a number concept card to show the number of objects in the set. The other child uses counters to form a second set containing more objects than the first set, and a number concept card to show the number of objects in the set. Then the child says, for example, "I used six counters because a set of six has more than a set of five. The number six is greater than the number five."

How many?



3

2



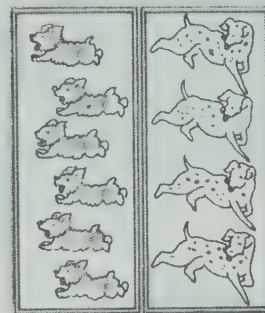
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6



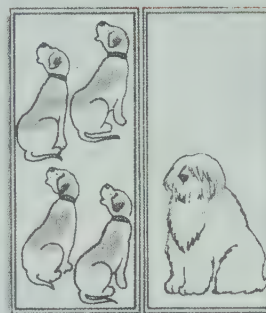
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6



6

4



4

1



9

8

6

7

3

4

2

0

3

1

9

6

4

5

66 (sixty-six)

Using greater than with numbers

Ring the greater number in each pair.

LESSON ACTIVITY

Before Using the Page

- Although many textbooks suggest that the symbols $>$ and $<$ be introduced in Grade 1, the use of these symbols is delayed until Grade 2 in this series so that an understanding of the concepts rather than the use of the symbols can be emphasized.

Place a set of five objects and a set of six objects in front of the children. Have one child use string to match the objects in the sets one to one. Ask which set has more objects. Have another child count the objects in each set and place the appropriate number concept card beside the set. Point to the two cards and say, "Because a set of six has one more than a set of five, we say that the number six is *greater than* the number five." Have the children say, "Six is greater than five." Repeat this procedure using various pairs of sets.

- Place two sets on the display board. Have the children hold up the appropriate number concept card for each set. Ask the children to think about the two numbers, decide which one is

greater, and then make a statement; for example, "Five is greater than three." Continue this activity until the children give almost automatic responses.

Using the Page

- Discuss the first pair of sets with the children by asking them how many dogs there are in the first set, how many dogs there are in the second set, and which set has more dogs. Have the children trace over the numerals and ring the greater number. Then have the children record the number of each of the other sets and ring the greater number in each pair.

For the two rows of pairs of numbers at the bottom of the page, have the children ring the greater number in each pair. Let them use counters, if necessary, to help them decide.

- After the children have completed the page, ask questions similar to the following:

"Find the set of white spotted dogs. Find the other set of white dogs. Which set has more dogs?"

"Find the two sets of dark brown dogs. Which set has more dogs?"

LESSON OUTCOME

Identify which of two numbers is less than the other

Materials

small objects, string, display board and cutouts, number concept cards and nine counters for each child

Vocabulary

less than

RELATED ACTIVITIES

- Adapt the activity suggested for page 66 to fit the objective for this lesson.
- Using flashcards showing the numerals 0 to 9, display two at a time. Have each child hold up the appropriate number concept card to indicate which number is less than the other. You may wish to have some children take turns selecting the cards for display.
- Children may use two regular dice for practice in comparing two numbers. If the two dice show the same number, they are rolled again.
- Play the game "Greater Than or Less Than" described on page T109.

How many?

Use a / to show the number in each pair that is less than the other.

Using less than with numbers

(sixty-seven) 67

LESSON ACTIVITY

Before Using the Page

- Place a set of five objects and a set of seven objects in front of the children. Have one child use string to match the objects in the sets one to one. Ask which set has fewer objects. Have another child count the objects in each set and place the appropriate number concept card beside the set. Point to the two cards and say, "Because a set of five has fewer objects than a set of seven, we say that the number five is *less than* the number seven." Have the children say, "Five is less than seven." Repeat this procedure using various pairs of sets.
- Place two sets on the display board. Have the children hold up the appropriate number concept card for each set. Ask the children to think about the two numbers, decide which one is less, and then make a statement; for example, "Four is less than six." Continue this activity until the children give almost automatic responses.

Using the Page

- Discuss the first pair of sets with the children by asking them how many cats there are in the first set, how many cats there are in the second set, and which set has fewer cats. Have the children trace over the numerals and mark a check beside the lesser number. Then have the children record the number of each of the other sets and mark the lesser number in each pair.

For the two rows of pairs of numbers at the bottom of the page, have the children mark the lesser number in each pair. Let them use counters, if necessary, to help them decide.

- After the children have completed the page, you may wish to have them turn to page 66 and mark with a check the number that is less than the other in each pair. Have them consider each exercise by saying to themselves, for example, "Three is greater than two. So, two is less than three." Then they are to mark a check beside the 2.

You may wish to have the children follow a similar procedure for page 67.

LESSON OUTCOME

Identify a number one greater than or one less than a given number

Materials

a number line for demonstration, a number line for each child (See page T83.)

RELATED ACTIVITIES

- Have pairs of children work with numeral cards and a spinner as described for the activity "Before or After" on page T109.
- You may wish to play the game "War" described on page T109. Begin by having the children play in pairs so that only two numbers are being compared. You may prefer to begin with a deck that contains only two sets of cards, each showing the numerals 0 to 9.



What number comes before ?

<u>2</u>	3	<u>1</u>	2	<u>0</u>	1
<u>4</u>	5	<u>5</u>	6	<u>6</u>	7
<u>7</u>	8	<u>8</u>	9	<u>3</u>	4

What number comes after ?

5	<u>6</u>	1	<u>2</u>	0	<u>1</u>
8	<u>9</u>	4	<u>5</u>	3	<u>4</u>
2	<u>3</u>	7	<u>8</u>	6	<u>7</u>

What number comes between ?

2	<u>3</u>	4	6	<u>7</u>	8	3	<u>4</u>	5
5	<u>6</u>	7	4	<u>5</u>	6	7	<u>8</u>	9
0	<u>1</u>	2	1	<u>2</u>	3	5	<u>6</u>	7

What number comes before and what number comes after ?

<u>2</u>	3	<u>4</u>	<u>1</u>	2	<u>3</u>
<u>7</u>	8	<u>9</u>	<u>5</u>	6	<u>7</u>
<u>0</u>	1	<u>2</u>	<u>3</u>	4	<u>5</u>
<u>4</u>	5	<u>6</u>	<u>6</u>	7	<u>8</u>

68 (sixty-eight)

Recording ■ number one greater than or one less than a given number

LESSON ACTIVITY

Before Using the Page

- Provide each child with a number line. Call out a number and have the children find that number on their number lines. Do this for all the numbers from 0 to 9 in no particular order. Also, have them show the number of "steps" needed to reach a particular number on the number line; for example, five steps from zero are needed to reach the location labelled 5.

Call out a number and have the children find the number that comes after the given number. Have one child make a statement using the two numbers and the phrase "is greater than"; for example, "Three is greater than two." Repeat with other numbers. Then adapt the activity for "is less than".

Call out two consecutive even (odd) numbers, for example, 2 and 4. Ask what number comes between the two numbers. Have one child make a statement using the two numbers and the word "between"; for example, "Three is between two and four." Repeat with other numbers.

- As the children become more proficient, call out one number

and ask them to state a number that is greater than the number. For example, if you call out "five", the children respond with "six", or "seven", or "eight", or "nine" in a statement such as, "Six is greater than five." The usual response for this question will be the number that is one greater than the given number, but encourage the children to go beyond the obvious answer; that is, encourage a response such as "Nine is greater than five."

Adapt the preceding activity for numbers that are less than a given number. Again, encourage the children to go beyond the obvious answer.

Using the Page

- Read the question for each set of exercises with the children. After discussing the first exercise in each set, have the children trace over the dotted numeral.

As the children work on the page, encourage them to try to complete the exercises without looking at the number line at the top of the page. However, tell them to use the number line for help if they need it.

LESSON OUTCOME

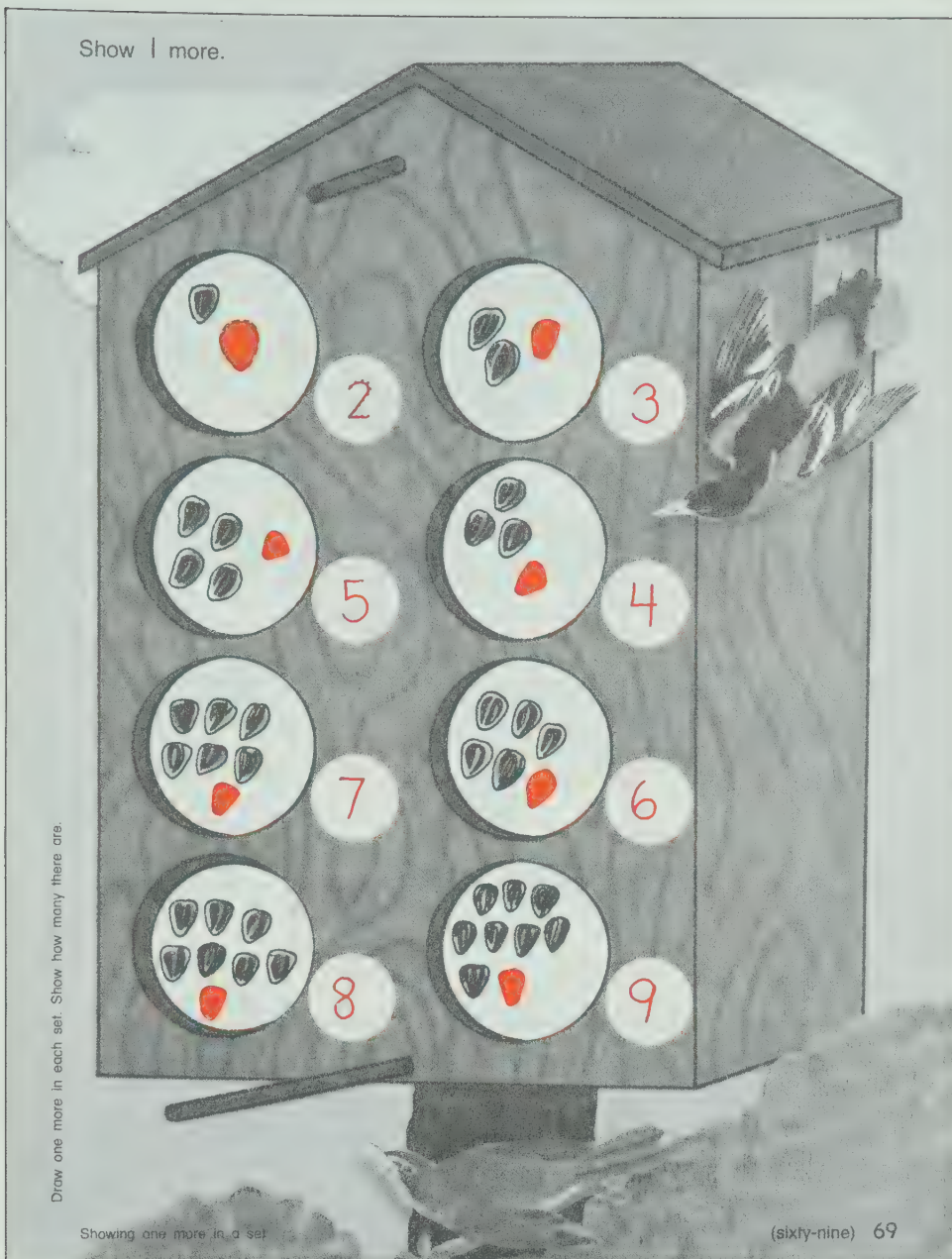
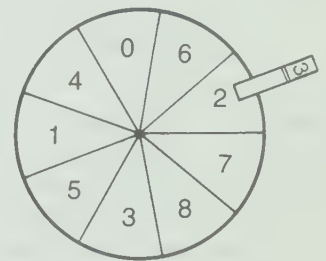
Show a set with one more member than a given set

Materials

display board and cutouts, a ball for each child

RELATED ACTIVITIES

- Ask the children to use their counters to make a set of six counters. Then ask them to place one more counter in the set. Ask them to explain what they did by saying, "Six and one more are seven." Now ask the children to make a set of their own choice (using not more than eight counters) and then to place one more counter in the set. Ask as many children as possible to explain what they did.
- Cut a circular shape from cardboard. Divide it into nine parts and print the numerals as shown. Mark the numerals 1 to 9 on clothes pins. Have the children show "one more" by clipping a clothes pin to each section.



LESSON ACTIVITY

Before Using the Page

- Place a set of three cutouts on the display board. Have one child state the number of cutouts in the set. Ask another child to place one more cutout in the set and to state how many there are in the set. Repeat several times with sets of not more than eight cutouts.
- Practise counting to nine with the children. Start at *one* and ask children in turn to say the next number. Emphasize the idea of *one more*.
- Give a ball to each child. Bounce a ball five times, for example, while the children silently count the bounces. Then have them bounce their balls one more time than the number counted and say, "Five and one more are six."

If you prefer a less lively activity, have one child clap a certain number of times. Ask other children to clap the same number of times and then one more time, and to make a statement similar to the one above.

Using the Page

- Read the instruction at the top of the page with the children. Ask how many brown seeds there are in the first set and how many seeds are outlined. Have the children trace over the dotted seed. Then ask how many seeds there are in the set. Have the children trace over the dotted 2. Then have the children continue on their own, counting the seeds in each set, drawing one more seed in the set, and printing the numeral to show the number of seeds in the set.
- After the children have completed the page, have them make a statement for each exercise. For the first exercise, for example, the response would be "One and one more are two." Then have the children solve problems similar to the following:
 1. Look at the first set of seeds in the second row. If you draw one more seed, how many seeds will there be in the set?
 2. Look at the second set of seeds in the third row. If you draw one more seed, how many seeds will there be in the set?
 3. Look at the second set of seeds in the first row. If you draw one more seed, how many seeds will there be in the set? Which other set has the same number of seeds?

LESSON OUTCOME

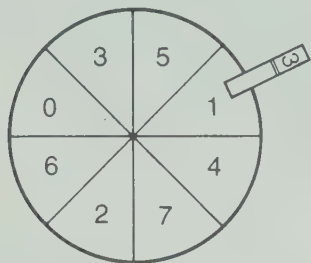
Show a set with two more members than a given set

Materials

display board and cutouts, counters for each child, a ball for each child

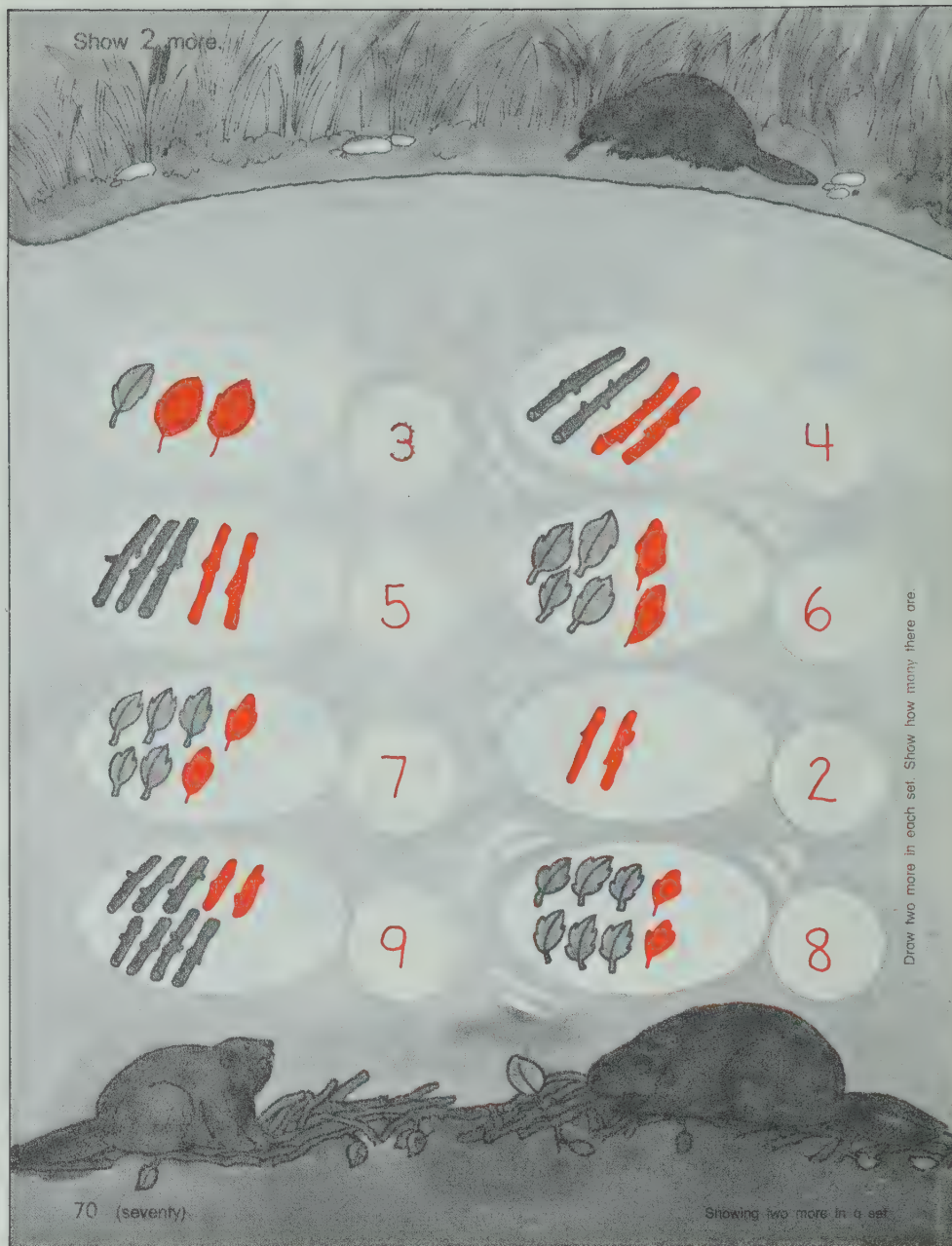
RELATED ACTIVITIES

- Adapt the activities involving bouncing balls or clapping hands suggested for page 69, and read the rhyme on page T69 again.
- As for page 69, cut a circular shape from cardboard and divide it into eight parts. Print the numerals as shown. Use the clothes pins with the numerals printed on them. Have the children show "two more" by clipping a clothes pin to each section.



- Give each child a piece of paper divided into five sections. The first section is for 0 or 1. Have the children work from left to right and draw a set of "two more" in the frames. Then have them show the number of each set.

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LESSON ACTIVITY

Before Using the Page

- Place a set of four cutouts on the display board. Have one child state the number of cutouts in the set. Ask another child to place two more cutouts in the set and to state how many there are in the set. Repeat several times with sets of not more than seven cutouts.
- Have the children use up to seven counters to make one set and then place two more counters in the set.
- Draw a number line on the chalkboard. Start at 0 and draw an arrow to 2. Have children in turn draw arrows to continue the skip counting by twos. When the four arrows are drawn, have the children skip count by twos. The children will be stating the even numbers: 0, 2, 4, 6, and 8.



Remove the arrows and have children start at 1 and show skip counting by twos. When the four arrows are drawn, have

the children skip count by twos. The children now will be stating the odd numbers: 1, 3, 5, 7, and 9. Have the children try to count by twos without using the number line.

Using the Page

- Read the instruction at the top of the page with the children. Ask how many leaves there are in the first set and how many leaves are outlined. Have the children trace over the dotted leaves. Then ask how many leaves there are in the set. Have the children trace over the dotted 3. Then have the children continue on their own, counting the leaves or sticks in each set, drawing two more objects in the set, and printing the numeral to show the number of objects in the set.
- After the children have completed the page, have them make a statement for each exercise. For the first exercise, for example, the response would be "One and two more are three." Then have the children solve problems similar to the following: 1. Look at the set of leaves in the second row. If you draw two more leaves, how many leaves will there be?

LESSON OUTCOME

Show a set with three more members than a given set

Materials

display board and cutouts, counters for each child

RELATED ACTIVITIES

- Adapt the activities involving bouncing balls or clapping hands suggested on page T93.
- If you wish, adapt the activities involving clothes pins suggested for pages 69 and 70.
- Make game cards divided into nine parts. Print the numerals from 0 to 8 in different positions on each card. Give each child a card and seven markers. Have the children respond to statements such as:
 "Cover the number that is one more than seven."
 "Cover the number that is two more than four."
 "Cover the number that is three more than one."
 The first child to cover three numbers in a row is the winner.

6	4	1
8	0	7
2	5	3



LESSON ACTIVITY

Before Using the Page

- Place a set of two cutouts on the display board. Have one child state the number of cutouts in the set. Ask another child to place three more cutouts in the set and to state how many there are in the set. Repeat several times with sets of not more than six cutouts.
- Begin at zero and build sets of three, three and three more, and then six and three more on the display board. Have a child make a statement for each set; for example, "Zero and three more are three."
- Play the game "I Am Thinking of a Number". To start the game say, "I am thinking of a number that is one and three more. What is the number?" Have the children use counters to discover what the number is and then ask one child to reply by saying, "One (pause) two, three, four. The number is four." Encourage the children to start from the number rather than starting at *one* and arriving at the number required. For example, if you say, "I am thinking of a number that is five and

three more. What is the number?", the reply should be "Five (pause) six, seven, eight. The number is eight." Let the children have turns at being the leader.

Using the Page

- Read the instruction at the top of the page with the children. Ask how many eggs there are in the first nest and how many eggs are outlined. Have the children trace over the dotted eggs. Then ask how many eggs there are in the nest. Have the children trace over the dotted 5. Then have the children continue on their own, counting the eggs in each nest, drawing three more eggs in the nest, and printing the numeral to show the number of eggs in the nest.
- After the children have completed the page, have them make a statement for each exercise. For the first exercise, for example, the response would be "Two and three more are five." Then have the children solve problems similar to the following:
 1. Look at the second nest in the first row. If you draw three more eggs in the nest, how many eggs will there be in the nest?

LESSON OUTCOME

Recognize the action of joining two sets and associate numbers with the sets

Materials

small objects for making sets, counters or a set of elevator beads for each child

Vocabulary

join

Background

The operation of joining sets forms one concept for addition of numbers. Addition is associated with the joining of two sets having no members in common. Be careful when using the words *join* and *add*. *Join* is used conventionally for sets and *add* is used for numbers.

RELATED ACTIVITIES

- Use teacher-made cards showing two sets. The children are to show the results of joining the two sets.



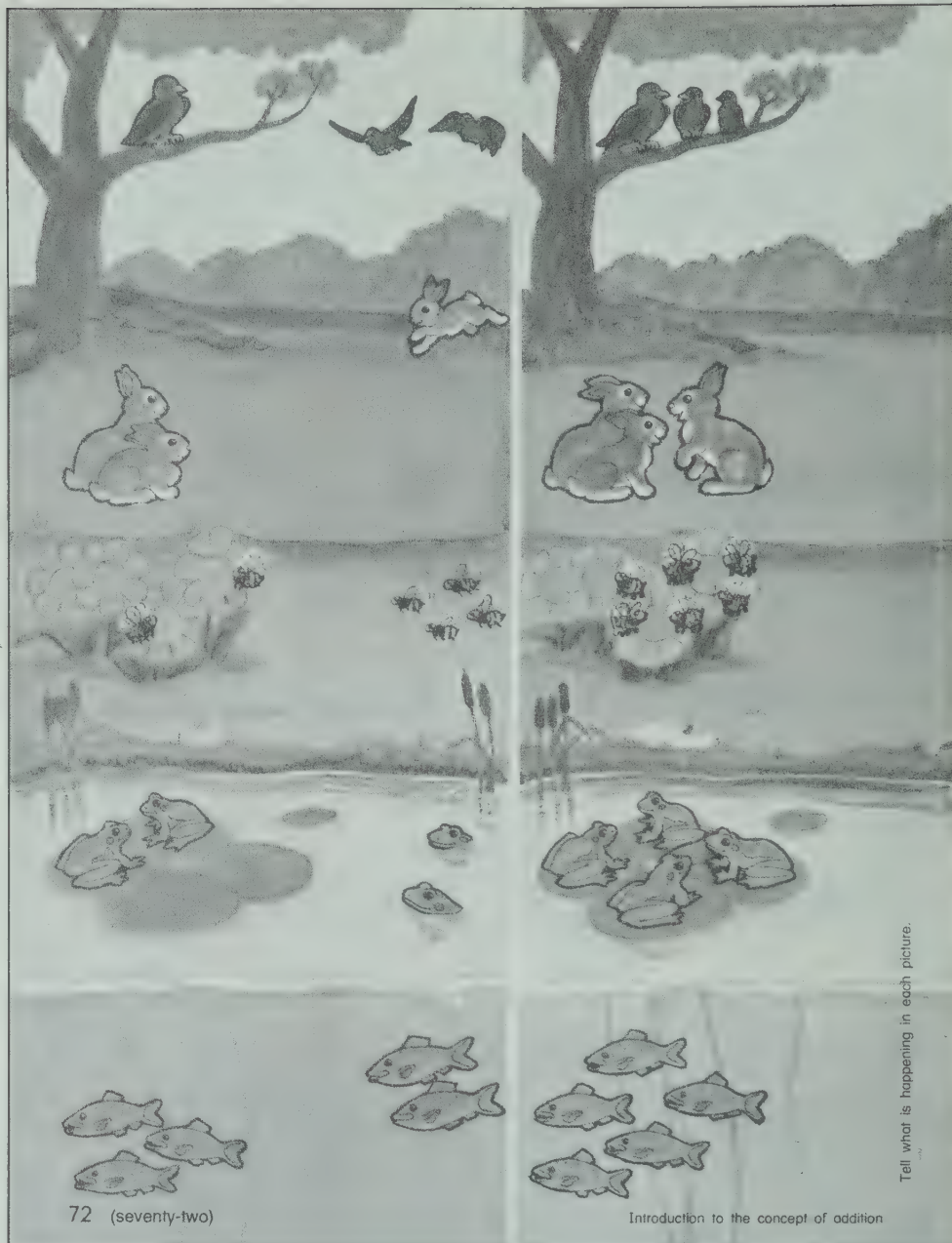
- Use teacher-made self-checking cards. From a set of cards the children must locate the result of joining two sets. Matching cards will fit together similar to a jigsaw puzzle.



LESSON ACTIVITY

Before Using the Page

- Ask two children to stand together in one place in the classroom. Ask three children to stand together in another place in the classroom. Ask, "How many children are there in the first group? How many children are there in the second group?" Have the two children stay where they are and have the three children walk over to join them. Ask a child to describe what happened by saying, "Two children were joined by three children to make a set of five children." Repeat with other groups of children, but keep the groups small.
- Have one child form one set of toy cars, for example, and another child form another set. Ask how many toy cars there are in each set. Ask the second child to move her/his toy cars to join those of the first child. Ask other children to explain the joining situation. Try to have the children first say the number for the set that didn't move, then say the number for the set that joined the first set, and finally say the number of the two sets together.



Tell what is happening in each picture.

- Have the children work with their counters. Ask them, for example, to make a set of two and a set of four. Ask them to join the two sets to make a new set and to tell how many there are in the new set. Repeat for other examples.

Using the Page

- Discuss the pictures with the children and ask them to describe what is happening in each situation. Note that at the top of the page, the action situation occurs above ground. Moving down the page, the action situations take place on the ground, then on the surface of the water, and finally, underwater. As the children interpret each joining action, have them make statements to describe what is happening; for example, "There is one bird. Two birds come to join it. Then there are three birds." Each situation may also be described in the following way: "One bird is joined by two birds to make a set of three birds."

LESSON OUTCOME

Interpret the joining of two sets to form a new set and record the number of each set

Materials

display board and cutouts, counters and number concept cards for each child

Vocabulary

complete

RELATED ACTIVITIES

- Choose a simple word such as "come". Print part of the word on a card and the remaining part of the word on another card. On the other side of each of the two cards print a numeral. On a third card, print the complete word on one side and the sum of the two numbers on the other side. Make many sets of these cards, using different words and sums.

co and me is come
(on one side)

2 and 3 is 5
(on the opposite side)

The children may use counters and try singly, in pairs, or in groups to find the three cards that belong together.

Complete.

2 and 1 is 3

3 and 2 is 5

2 and 2 is 4

4 and 2 is 6

3 and 3 is 6

Show how many there are in each set.

Recording the numbers of sets for addition

(seventy-three) 73

LESSON ACTIVITY

Before Using the Page

- Ask three children to come and stand beside you. Tell the children that you are a set of one. Ask how many came to join you. Ask other children how many there are in the new set. Explain the joining by saying, "A set of one and a set of three make a set of four." Repeat with other sets of children.
- Place a set of two objects and then a set of three objects on the display board. Ask a child to place the appropriate numeral below each set. Now have the children use their counters to make these sets and then join them to make a new set. Ask the children to describe what they did by saying, "A set of two and a set of three together make a set of five." Have a child illustrate this by placing five objects on the display board and placing the numeral below the set.
- Have the children work with their counters and their number concept cards. Ask them to make a set of one and place the appropriate card beside the set. Repeat for a set of four. Now have the children make a new set with as many counters as the

two sets together and show the appropriate card. Have them say, "A set of one and a set of four is the same as a set of five." Repeat for other examples.

Using the Page

- Discuss each of the five situations with the children. For example, have the children look at the bluejays. Say, "There are two bluejays. One bluejay is coming to join them. Think of the bluejays all together as one group and look on the other side of the waterfall. How many bluejays are there?" Have the children trace over the dotted numerals and say to themselves the statement corresponding to the situation; for example, "Two and one together is the same as three."

Have a child describe the situation involving the rabbits by saying, for example, "There are three rabbits. Two rabbits are coming to join them. When they are all together in one group there are five rabbits." Have the children record the number for each set. Follow a similar procedure for the three other situations.

LESSON OUTCOME

Recognize the word *plus* and the sign + and know that they relate to addition

Materials

display board and cutouts, flash card showing the word *plus*

Vocabulary

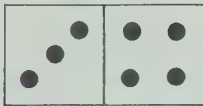
plus (+), add, addition

Background

Now that the children can interpret action situations and associate numbers with them, the symbol for addition is introduced. When the symbol + appears, urge the children to say "plus" instead of "and".

RELATED ACTIVITIES

• From a commercial or homemade set of dominoes, remove those for which the sums are greater than nine. Give one of the remaining dominoes to each child. Have the children write the two number names for their dominoes. For example, for this domino



the child would write $3 + 4$ and 7. Have the child tell the domino's story by saying, "Three plus four is (the same as) seven." If you wish, have the child turn the domino the other way round and write the corresponding number names ($4 + 3$ and 7).

LESSON ACTIVITY

Before Using the Page

• Place a set of two cutouts and a set of three cutouts on the display board. Ask how many cutouts there are in each set. Have children place the appropriate numeral below each set. Ask how many cutouts there will be if the two sets are joined. Ask children to place five cutouts to the right of the two sets and the appropriate numeral below the set. Have one child make the statement, "A set of two and a set of three is the same as a set of five." Tell the children that we have a short way of writing "2 and 3". Place a + between the 2 and the 3 and read the phrase as "two *plus* three". Display a flash card with the word *plus* on it. Have the children say the word. Explain that $2 + 3$ is a short way of showing that two objects are joined by three more, and that $2 + 3$ is a name for all the objects just as 5 is. The phrase $2 + 3$ and the numeral 5 are names for the same number. Tell the children that a number can have different names in the same way that a girl whose name is Elizabeth may also be called "Beth" or "Liza", or a

Complete.



2

plus
+

3

is

5



2

plus
+

2

is

4



1

plus
+

4

is

5



3

plus
+

2

is

5

74 (seventy-four)

Introduction to the word *plus* and the sign -

Show how many there are in each set.

boy whose name is James may also be called "Jim" or "Jamie".

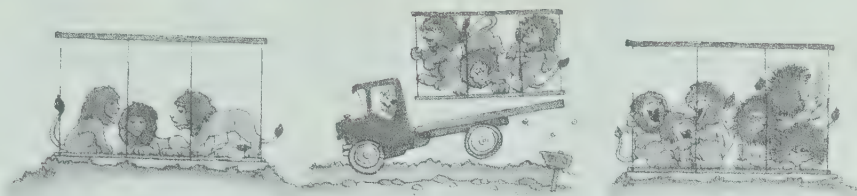
• Draw a set of three and a set of one on the chalkboard. Have a child go to the chalkboard and draw a set showing how many there are when the two sets are joined. Have other children record the numbers of the sets and the symbol for addition. Tell the children that "three plus one" means that we are to *add* the numbers of the two sets. Repeat this procedure with other examples.

Using the Page

• Discuss the first exercise with the children. As you ask them how many tigers there are in each set, have them trace over the dotted numerals. Then have them read the word "plus" and trace over the symbol +. Have a child make the statement: "Two plus three is (the same as) five." Have the children continue on their own, recording the numerals and the symbols.

After the children have completed the page, have them describe each situation in their own words and read aloud a statement for each exercise; for example, "One plus four is (the same as) five."

Complete.



$$\underline{3} \quad \text{plus} \quad \underline{3} \quad \text{equals} \quad \underline{6}$$



$$\underline{4} \quad \text{plus} \quad \underline{2} \quad \text{equals} \quad \underline{6}$$



$$\underline{3} \quad \text{plus} \quad \underline{4} \quad \text{equals} \quad \underline{7}$$



$$\underline{6} \quad \text{plus} \quad \underline{3} \quad \text{equals} \quad \underline{9}$$

Show how many there are in each set

Introduction to the word *equals*, the sign =, and the number sentence to show addition

(seventy-five) 75

LESSON OUTCOME

Recognize the word *equals* and the sign = ; complete number sentences to show addition

Materials

display board and cutouts, flash card showing the word *equals*, counters for each child

Vocabulary

equals (=), number sentence, addition sentence

RELATED ACTIVITIES

- Have the children use the dominoes as suggested on page T98. Now the children can include the symbol = when they write the number sentences.
- Involve the children in the activity "Building Sailboats" described on page T109. The children may work singly, in pairs, or in small groups.

LESSON ACTIVITY

Before Using the Page

- Review the use of the symbol + to indicate that numbers are to be added. Remember to avoid saying "add the sets" and also try to avoid using the symbol + between pictures of sets.
- Place a set of two cutouts and a set of three cutouts on the display board. Have a child place 2, +, and 3 below the sets. Have another child make a set of five and place the numeral 5 below it. Write "2 + 3 is the same as 5" on the chalkboard. Read the sentence and tell the children that we have a short way of writing "is the same as". Erase the words "is the same as" and print the symbol =. The symbol for equality can be read "is the same as", "is equal to", or "equals". Display a flash card with the word *equals* on it. Have the children say the word. Print "equals" above the symbol =. Now read the sentence 2 + 3 = 5 as "Two plus three equals five." Tell the children that we call "2 + 3 = 5" a *number sentence*. Because the number sentence 2 + 3 = 5 tells about addition, it may be called an *addition number sentence*. Write the

number sentence 2 + 2 = 4 on the chalkboard and have a child read it and state that it is an addition number sentence, or simply an addition sentence. Repeat the procedure with other examples.

- Have the children use counters to make two sets. Have them make a third set having as many counters as the two sets together. Ask them to write the corresponding number sentence. Discuss as many number sentences as possible. You may wish to have some children use their number concept cards and symbol cards instead of writing the number sentences.

Using the Page

- Discuss the first exercise with the children. Ask them how many lions there are in each set, and have them trace over the dotted numerals. Then have them read the word "plus" and the word "equals". Have them trace over the symbols + and =. Have a child read the addition sentence: "Three plus three equals six." Have the children continue on their own, printing the numerals and the +'s and the ='s.

LESSON OUTCOME

Write number sentences to show addition




Materials

display board and cutouts, yarn for set holders, counters for each child

RELATED ACTIVITIES

- Ask two children to stand at the front of the classroom. Give each child a ball. Show a numeral only to the first child. This indicates the number of times the ball is to be bounced. Show another numeral only to the second child and have her/him bounce the ball that number of times. The other children are to count how many times each ball is bounced. Then they will use their counters, if necessary, to help them write the addition sentence. Continue by having other children bounce the balls according to your instructions.

Complete.

 $3 + 2 = 5$	 $4 + 3 = 7$
 $2 + 5 = 7$	 $4 + 4 = 8$
 $5 + 4 = 9$	 $6 + 2 = 8$

76 (seventy-six)

Writing addition sentences

LESSON ACTIVITY

Before Using the Page

- Write the addition sentence $1 + 3 = 4$ on the chalkboard. Have a child read it. Ask other children what the symbols $+$ and $=$ mean. Have a child illustrate the addition sentence using cutouts on the display board while the other children use their counters. Repeat for other addition sentences.
- Place a set of two cutouts and a set of four cutouts inside separate loops of yarn on the display board. Ask how many cutouts there are in each set. Have children show the numeral below each set. Place a large loop of yarn around the two sets. Tell the children that this shows the two sets are being joined. Ask what symbol should be placed between the 2 and the 4. Have a child show the symbol $+$. Ask how many cutouts there are when the two sets are joined. Place the numeral 6 to the right of $2 + 4$. Ask what symbol is needed to show that $2 + 4$ and 6 are names for the same number. Have a child show the symbol $=$. Repeat this procedure so that as many children as possible will be able to participate.

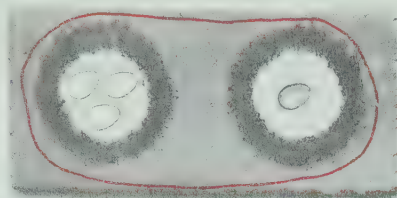
- Adapt the preceding activity so that children write the addition sentence step by step as you show the first set, the second set, and then the large set holder. Some children may work on the chalkboard while the others work at their desks. After each example, ask children to read the addition sentence.

Using the Page

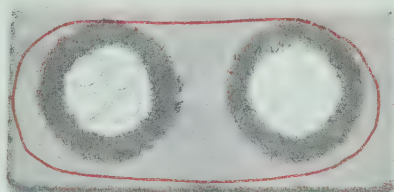
- Discuss the first exercise with the children. Ask how many beans there are in each set and have the children trace over the dotted 3 and the dotted 2. Ask how many beans there are in the two sets together. Have the children trace over the dotted ring and the dotted 5. Ask how we show that two numbers are to be added and have the children trace over the dotted $+$. Ask how we show that $3 + 2$ and 5 are names for the same number. Have the children trace over the dotted $=$. Ask a child to read the addition sentence.

Follow a similar procedure for the second exercise and then have the children continue on their own. Emphasize that a ring is drawn around each pair of sets to indicate that they are joined together.

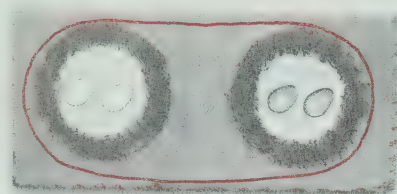
Complete the number sentences.



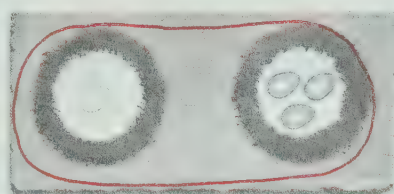
$$3 + 1 = \underline{4}$$



$$4 + 0 = \underline{4}$$



$$2 + 2 = \underline{4}$$



$$1 + 3 = \underline{4}$$

$$1 + 1 = \underline{2}$$

$$0 + 1 = \underline{1}$$

$$0 + 3 = \underline{3}$$

$$1 + 2 = \underline{3}$$

$$2 + 1 = \underline{3}$$

$$1 + 0 = \underline{1}$$

$$2 + 0 = \underline{2}$$

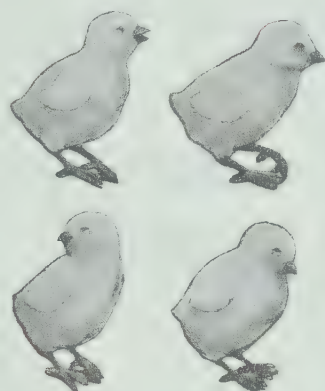
$$2 + 2 = \underline{4}$$

$$3 + 0 = \underline{3}$$

$$0 + 4 = \underline{4}$$

$$1 + 3 = \underline{4}$$

$$0 + 2 = \underline{2}$$



Adding, sums to 4

(seventy-seven) 77

LESSON OUTCOME

Complete addition sentences for sums to 4

Materials

objects of different colors, display board and cutouts, counters for each child

RELATED ACTIVITIES

• Challenge the children to find the addition sentences in the two columns of exercises that show all the possible number combinations for 3. Have them write these addition sentences in pairs.

$$0 + 3 = 3$$

$$1 + 2 = 3$$

$$3 + 0 = 3$$

$$2 + 1 = 3$$

• Draw a number line on a strip of wood. Use finishing nails to mark the positions for the numerals. For showing $2 + 3$, for example, place a bead on the nail for 2, count three units to the right, and place another bead on the nail for 5. This device helps to prevent the children from counting two units, counting three more units, and then starting again and counting from one to five.

Have the children work with this device in their spare time. Their competency in using the number line will be an asset when they begin later work with rulers in measurement activities.

LESSON ACTIVITY

Before Using the Page

• Display two red balls. Ask the children how many balls there are. Then include two blue balls. Ask how many balls there are altogether. Have one child state the addition sentence ($2 + 2 = 4$) and another child write it on the chalkboard. Repeat with other sets of objects.

• Place two cutouts inside a set holder on the display board. Place another set holder beside the first one, but do not put any cutouts in it. Ask how many cutouts there are in the first set and how many cutouts there are in the second set. Lead the children to say that there are zero cutouts in the second set. Have a child state the addition sentence ($2 + 0 = 2$) and another child write it on the chalkboard. Repeat several times for other addition sentences for which there are zero cutouts in either the first set or the second set.

• Draw a set of two objects and a set of one object on the chalkboard. Write $2 + \underline{\quad} = \underline{\quad}$. Ask what numbers are needed to complete the addition sentence. Repeat the procedure

with other sets of objects and have the children complete sentences in the following forms:

$$3 + \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} + 3 = \underline{\quad}$$

$$\underline{\quad} + \underline{\quad} = \underline{\quad}$$

• Write an addition sentence on the chalkboard (sum of 4 or less) and have children use their counters to illustrate it. Repeat several times for other addition sentences.

Using the Page

• For the first exercise, ask how many white eggs there are, how many brown eggs there are, and how many eggs there are in the two nests together. Have the children draw a ring around the two nests and trace over the dotted 4. Then have the children complete the three other exercises.

• For completing the two columns of exercises, the children may use the four chickens as counters.

• After the children have completed the page, have them refer to the four pairs of nests and state number combinations for 4 (3 and 1, 4 and 0, 2 and 2, 1 and 3). Ask them to state another number combination for 4 that is not shown (0 and 4).

LESSON OUTCOME

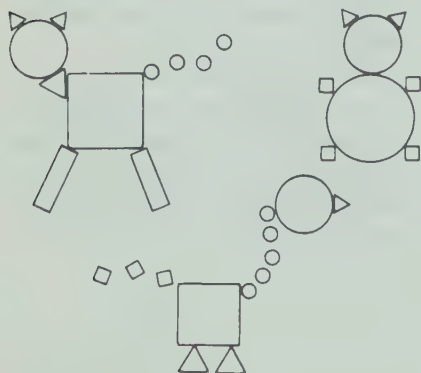
Use two-dimensional shapes to make a design

Materials

display board and cutouts of the four basic shapes, attribute blocks, a sheet of paper and crayons for each child

RELATED ACTIVITIES

- Give an attribute block to each of several children. Have each child in turn trace around the block on a large sheet of paper. Then have them exchange blocks and trace around the new block. The purpose of this activity is to have the children create a picture or a pattern made of two-dimensional shapes. Then you may wish to have them color the picture or the pattern. If the children make a picture of an animal, they may enjoy adding bits of materials to make the picture more interesting; for example, seeds or buttons for eyes, and bits of yarn for a tail.



LESSON ACTIVITY

Before Using the Page

- Review the names of the four shapes: circle, rectangle, square, and triangle. Show shapes on the display board and ask the children to identify them.
- Draw a circle on the playground large enough for a number of children to stand inside. Ask the children to run around outside the circle until a whistle is blown or a horn is sounded. Ask them to move inside the circle when they hear the whistle. When they hear the horn they are to move *on* the circle. Continue the game using several shapes.
- Make pictures by tracing around attribute blocks. Have the children match the attribute blocks to the pictures according to shape and size.
- Have the children sit in a ring. Place the attribute blocks (circles, rectangles, squares, and triangles only) in a pile in the centre of the ring. Ask children to find, for example, a thin blue triangular shape or a thick red circular shape. The child

who chooses the correct piece keeps it until the end of the game.

- Blindfold several children and have them find a shape by touch, for example, a small triangular shape or a large square shape.
- Put three or four attribute blocks on a tray and have the children look at them. Then cover the tray and ask children to state what they saw.

Using the Page

- Have the children trace around attribute blocks to make a picture. If you do not have attribute blocks, use related shapes from parquetry blocks. You may prefer to have the children make pictures by tracing around small boxes, jars, and covers on sheets of paper. Have the children color their pictures.

Ring and mark.

LESSON OUTCOME

Relate the concepts *fastest* and *slowest* to movement

Materials

pictures of fast-moving and slow-moving animals

Vocabulary

quickly, slowly, fast, faster, fastest, slow, slower, slowest

RELATED ACTIVITIES

- Prepare pages for a booklet of "Fast Animals" and a booklet of "Slow Animals". Have the children cut pictures from magazines and paste them in the appropriate booklet.
- Read the poem on page T109 for this page to the children. They may use hands and fingers to mime the actions. The first two lines may be read slowly and the last two lines more quickly.

Ring the one that moves fastest. Use a ✓ to show the one that moves slowest.



Introduction to the concepts fastest and slowest

(seventy-nine) 79

LESSON ACTIVITY

Before Using the Page

- Begin a discussion with the children about things they do quickly and things they do slowly. Ask these questions: "If you were late for school, would you walk or would you run?" "If you had to go somewhere that you did not want to go, would you walk or would you run?"

Have the children explain why they do some things quickly and some things slowly.

Ask the children if it would be faster to run to school, for example, or to walk. Ask if there would be a faster way of going to school. Ask which would be faster – going by bicycle or going by car.

Ask the children to state the fastest way they have ever travelled. Ask if they know an even faster way to travel.

Until now the discussion has been very personal to the children. Lead the discussion away from the children and their activities. For example, start a discussion about animals. Show

the children pairs of pictures of animals and have them state which animal can move faster than the other; for example, a cat can move faster than a turtle. Suggest animals in pairs and have the children visualize which moves faster in each pair. In the gym or schoolyard you might have the children pretend to be either fast-moving or slow-moving animals. If the children use sounds and actions, other children might try to guess what animals are being imitated.

Using the Page

- Have the children interpret the four pictures in the first set as running, crawling, hopping, and walking. Ask which method of moving is the fastest. Have them ring the appropriate picture. Then ask them which method of moving is the slowest. Have them mark the appropriate picture with a check.
- For the second set of pictures, have the children pretend that the four animals are going to run a race. Ask which animal will win and which one will be last. Have the children make the appropriate marks. Let the children work independently for the last two sets of pictures and then discuss their answers.

LESSON OUTCOME

Determine which of two objects is heavier than the other

Materials

objects for lifting and comparing their masses including some of the objects shown on the page

Vocabulary

heavy, heavier than

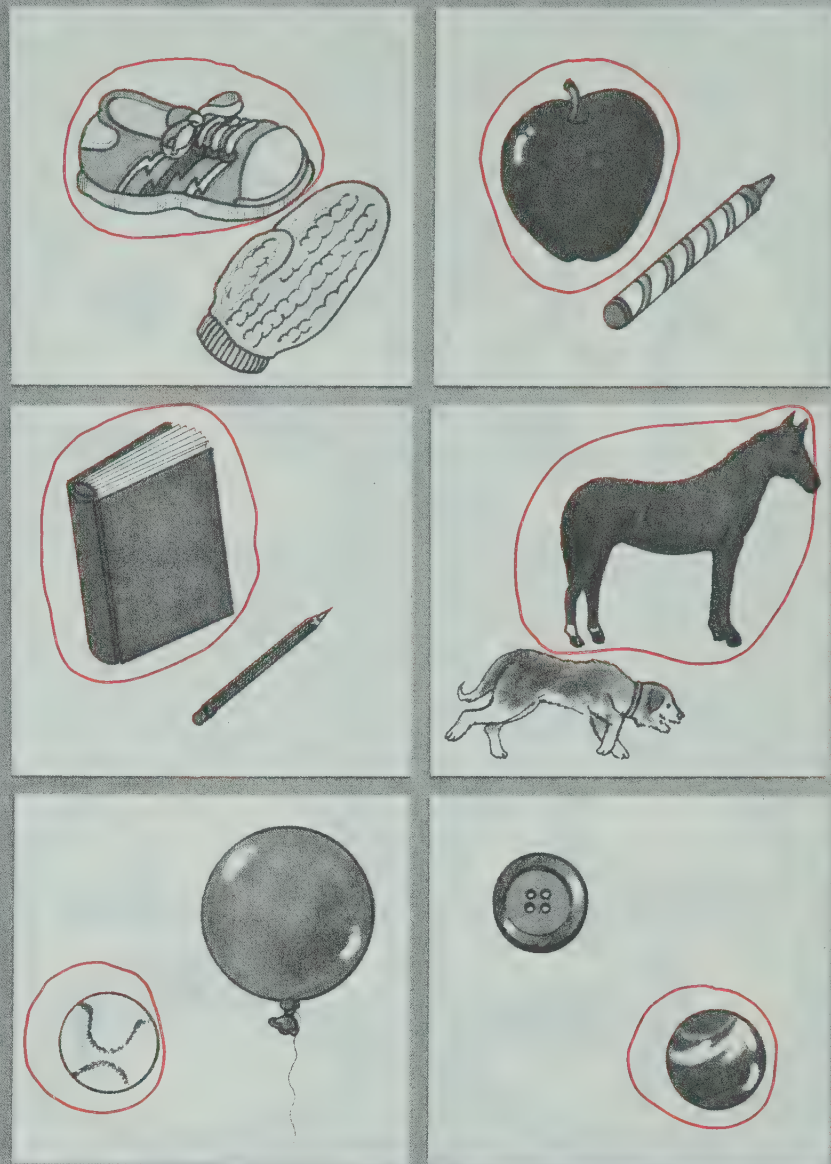
Background

With the changeover to the International System of Measures (SI) it is recommended that we no longer speak of the weight of a book, the weight of the apples in a bag, or our own weight. We are encouraged to say "the mass of the book", "the mass of the apples in the bag", and "my mass". There should be no need to speak of *mass* at this time. Simply limit the idea to something being heavier than or lighter than something else.

RELATED ACTIVITIES

- Have each child cut pictures from magazines or catalogues of five things that are heavier than a pencil or some other selected object. The children may paste these on a chart labelled "Heavier Than".
- Have the children make a "Heavier Than I Am" booklet in which they paste pictures of objects that are heavier than they are.

Ring.



80 (eighty)

Introduction to the concept heavier than

Ring the object in each pair that is heavier than the other.

LESSON ACTIVITY

Before Using the Page

- The concepts *heavier than* and *lighter than* can be introduced by comparing objects familiar to the children. Place a brick or a stone and a paper cup (or any two objects where one is much heavier than the other) in front of the children. Ask each of several children to pick up the brick or the stone in one hand and the paper cup in the other. Lead them to state that the stone is harder to pick up than the paper cup. Develop the idea that because it requires more effort to pick up the brick or the stone, it is *heavier than* the paper cup. Repeat this activity several times with other pairs of objects. Let each child hold one object in one hand and the other object in the other hand. Ask which object is heavier.
- Display several objects around the classroom or on a table. Have one child choose one of the objects. Have a second child choose an object that he/she thinks is heavier than the first, and then check by holding the objects, one in each hand. Repeat with different children choosing different objects.

- Ask the children to think of a cat and a car. Ask them which of the two they think is heavier. Consider other pairs of objects such as a hammer and a nail, a can of soup and a cake of soap.

Using the Page

- Have the children ring the heavier object in each pair. You may need to have available objects that are shown on the page. If some of the children have difficulty deciding which object is heavier, have them lift the objects (except, of course, the dog and the horse). If some of the objects pictured are unavailable, you may wish to make a work sheet showing objects that are available in your classroom.

LESSON OUTCOME

Determine which of two objects is lighter than the other

Materials

two covered cups filled with sand and flour; objects for lifting and comparing their masses, including some of the objects shown on the page

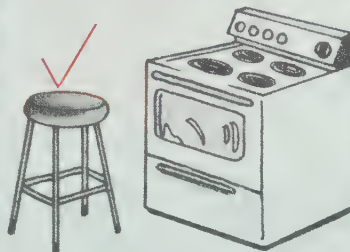
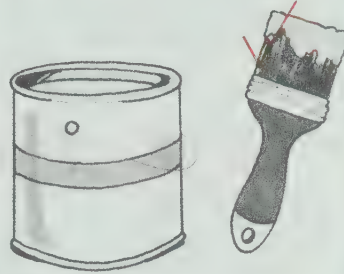
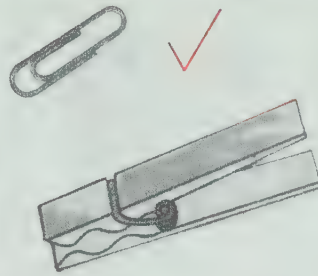
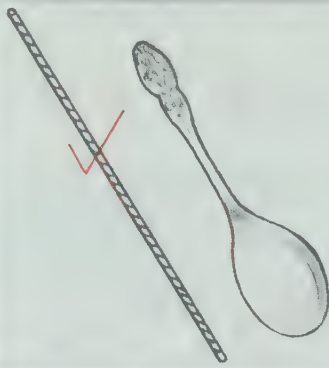
Vocabulary

light, lighter than

RELATED ACTIVITIES

- Have each child cut pictures from magazines or catalogues of five things that are lighter than a bicycle or some other selected object. The children may paste these on a chart labelled "Lighter Than".
- Have the children make a "Lighter Than I Am" booklet in which they paste pictures of objects that are lighter than they are.
- You may wish to extend this lesson by having the children compare three objects and decide which of the objects is the *lightest* and which is the *heaviest*.

Mark.



Use a ✓ to show which object in each pair is lighter than the other.

Introduction to the concept *lighter than*

(eighty-one) 81

LESSON ACTIVITY

Before Using the Page

- Review the concept *heavier than* with the children. You may wish to perform this experiment to demonstrate that "heaviness" is independent of size. Fill two identical containers (Styrofoam or paper cups with covers), one with sand and the other with flour. Place a cover on each cup so that the children cannot see what is inside. Ask the children which of the two they think is heavier. Some children will respond that they are the same because they are the same size. Have the children lift the cups and state which is heavier. Take off the covers and show the contents.
- Place a book and a balloon (or two objects where one is much lighter than the other) in front of the children. Ask children to lift the two objects. Lead them to state that the balloon is easier to pick up than the book. Develop the idea that because you don't have to use as much effort to pick up the balloon, it is *lighter than* the book. Repeat this activity several times with other pairs of objects. Have children state each

relation in two ways; for example, "The book is heavier than the pencil," and "The pencil is lighter than the book."

- Have the children take turns choosing objects from a display so that the second object is lighter than the first.
- Ask the children to think of a hockey puck and a skate. Ask them which of the two they think is lighter. Suggest other pairs of objects for comparison and have the children decide which object in each pair is lighter and which is heavier.

Using the Page

- Have the children use a check to mark the lighter object in each pair. You may need to have available objects that are shown on the page. If some of the children have difficulty deciding which object is lighter, have them lift the objects (except, of course, the stool and the stove). If some of the objects pictured are unavailable, you may wish to make a work sheet showing objects that are available in your classroom.

LESSON OUTCOME

Illustrate addition sentences

Materials

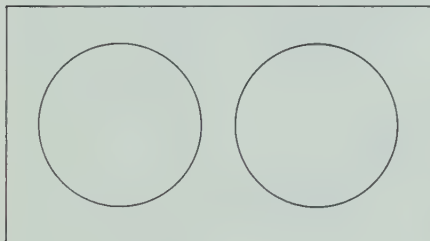
display board and cutouts, yarn or string for set holders, counters for each child

RELATED ACTIVITIES

- Prepare a work sheet showing the following chart.

0	1	2	3	4	5	4	3	2	1	0
---	---	---	---	---	---	---	---	---	---	---

Have the children choose two numbers from the chart and use their counters to make a set for each number. Then have them write the addition sentence. Encourage them to write as many different addition sentences as they can. (There would be 24 sentences if examples such as $2 + 1 = 3$ and $1 + 2 = 3$ are considered as being different.) You may wish to provide them with a piece of cardboard showing set holders for their sets.



Draw.

$1 + 2 = 3$

$2 + 2 = 4$

$1 + 3 = 4$

$3 + 2 = 5$

$4 + 4 = 8$

$6 + 3 = 9$

82 (eighty-two)

Illustrating addition sentences

Draw the shapes needed to illustrate each number sentence.

LESSON ACTIVITY

Before Using the Page

- Place two loops of yarn on the display board as set holders. Place two cutouts inside the first set holder and one cutout inside the second set holder. Ask how many objects there are in each set. Have children place the corresponding numeral below each set. Place a large loop of yarn around the two sets and have a child explain what it indicates. Then ask what symbol should be shown between the 2 and the 1. Have a child place the symbol $+$ on the display board. Ask how many cutouts there are when the two sets are joined. Ask children to place the symbol $=$ and the numeral 3 on the display board to complete the sentence. Have several children read the addition sentence $2 + 1 = 3$.
- Tell the children that you are going to show them part of an addition sentence and that they are to put the cutouts in the set holders and complete the sentence. Place two loops of yarn on the display board and show $2 + 3 = \underline{\quad}$ below them.

Ask two children in turn to place the appropriate number of cutouts inside each set holder. Ask a third child to place the large loop of yarn around the two sets and explain what it indicates. Ask a fourth child to complete the addition sentence. Ask several children to read the addition sentence as "Two plus three equals five." Repeat the procedure for different numbers of cutouts. Some children may work on the display board while the other children use their counters at their desks, with loops of string or paper plates as set holders.

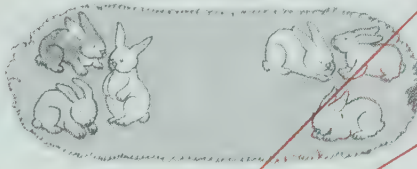
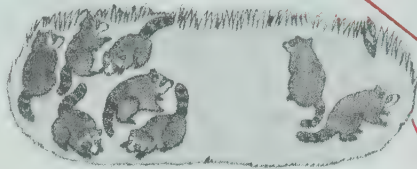
Using the Page

- Discuss the first exercise with the children. Ask how many starfish there are in the first set and how many starfish there are in the second set. Have the children trace over the ring to show that the two sets are joined. Then have them check that 3 is the correct number of starfish in all. Have the children continue on their own, drawing the number of objects required for each set and ringing each pair of sets to show they are joined. For four of the exercises, the children are to record the total number of objects they drew for each pair of sets.

Match.

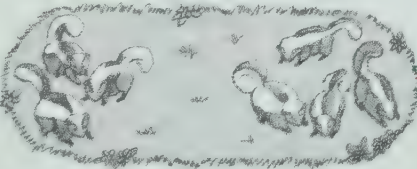
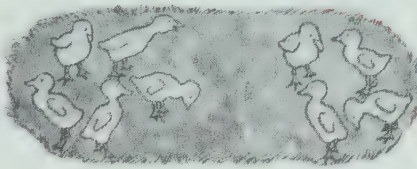
$2 + 2$

$1 + 1$



$1 + 0$

$2 + 1$



1

2

3

4

5

6

7

8

9

Draw lines to match.

Reviewing addition

(eighty-three) 83

OBJECTIVE

Demonstrate an understanding of the numbers one to nine

Materials

nine counters for each child

RELATED ACTIVITIES

- Prepare work sheets similar to the one shown. Have the children identify different names for the same number. Provide counters for those children who need them.

	(6)	
(4 + 2)		2 + 2
3 + 1		3 + 3
0 + 6		5 + 1
2 + 4		4 + 4
1 + 5		six

- Use the number sticks described on page T109 for the following activities.
 1. Select two sticks at random and determine which of the two numbers is greater (or less).
 2. Select a stick showing from one to six dots and then find a stick for the number that is one, two, or three greater than that number.
 3. Select two sticks at random and write an appropriate addition sentence.

LESSON ACTIVITY

Before Using the Page

- Review addition sentences and the corresponding joining of sets by playing the following game. Form two teams and choose a captain for each team. Each player has a set of nine counters. Call out a number and the word *plus*, for example, "two plus". Pause while the players in the first pair, one from each team, place the counters in front of them. Continue by saying, "four equals". The two players place four more counters and then find how many there are in the two sets together. The first player who gives the correct number scores a point for her/his team. Ask that player to state the complete addition sentence by saying, "Two plus four equals six." Also, have the player write the addition sentence on the chalkboard for the other children to check. Continue with other examples. Encourage children to try to give the answer without depending on the counters. The team that scores the most points wins.

Using the Page

- Discuss with the children how they are to draw lines matching a number name or a set on the left with the corresponding numeral on the right. Have the children trace over the dotted line joining $2 + 2$ and 4. Then let the children proceed on their own.

OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

RELATED ACTIVITIES

- The following activity will provide an opportunity to review the concepts *is greater than* and *is less than*.

Divide the class into two teams. Place ten cards showing the numerals 0 to 9 in a box for each team. The first player on each team draws one card from the box. The cards, for example, 5 and 9, are placed side by side, and the child who drew the numeral for the greater number says, "Nine is greater than five." The other child says, "Five is less than nine." The cards are returned to their respective boxes. The team drawing the card for the lesser number scores a point. Play continues until all the children have had a turn. Play again and award points to the team drawing the greater number. The team with the greatest number of points at the end of the game is the winner.

Complete.

4 + 2 = 6

3 + 5 = 8

0 + 7 = 7

5 + 4 = 9

3 + 2 = 5

4 + 3 = 7

1 + 1 = 2

2 + 1 = 3

0 + 4 = 4

1 + 2 = 3

2 + 2 = 4

2 + 0 = 2

3 + 1 = 4

1 + 3 = 4

84 (eighty-four)

CHECKUP

LESSON ACTIVITY

Before Using the Page

- The concepts *is greater than* and *is less than* and addition are introduced in Unit 4. Since page 84 deals with addition only, you may wish to review the comparison of sets and of numbers by having the children refer to page 83. Ask questions similar to the following:

"How many raccoons are there? How many rabbits are there? Which is the greater number?"

"How many owls are there? How many skunks are there? Are there fewer owls or fewer skunks? Which is less, five or seven?"

Using the Page

- Have the children recall the purpose of the *Checkup*. Elicit from them how they are to complete the addition sentences. For the first exercise, they are to trace over the dotted ring and record the number of young birds in the two nests together. For each of the other five pairs of nests, remind the children to ring

the two nests before they record the number of young birds in the two nests together.

- For the number sentences on the second part of the page, the children who need to may use the young birds as counters.

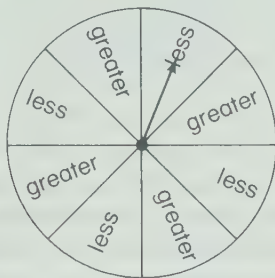
Games and Activities

Greater Than or Less Than (Game for page 67)

Children can play the following game in groups of three using a spinner as shown below. Each player requires nine counters.

Each of two players selects a number of counters, displays them, and makes a statement, for example, "I chose four counters." The third player spins the spinner and reads the indicated word aloud, for example, "less". The player who selected fewer counters than the other player scores one point and says, for example, "Four is less than seven." The game continues until one player has scored, say, five points. That player changes roles with the player responsible for the spinner, and a new game begins.

The game may be adapted for use with number concept cards in place of counters.



Before or After (Activity for page 68)

The spinner shown below may be used in an activity with one set of cards for the numerals 0 to 9 for two players. The cards are shuffled and placed face down in a pile. One player spins the spinner and reads the indicated word aloud, for example, "after". The other player turns over the top card of the pile, for example, 6, and names the numbers that come after six (seven, eight, nine). Then the players change roles. If a player turns over the card for 0 (9) when the spinner indicates before (after), he / she takes another turn.



War (Game for page 68)

A deck of cards containing four sets, each showing the numerals 0 to 9 is required. The entire deck (40 cards) is dealt so that each player receives the same number of cards; that is, there may be 2, 4, 5, 8, or 10 players.

At the same time, each player turns up the top card in her / his pile. The player whose card shows the greatest number collects the other cards and places them at the bottom of her / his pile. Players continue to turn up the top card at the same time, watching to see whose number is the greatest. When all the players but one have run out of cards, the game ends and the player with the most cards is declared the winner.

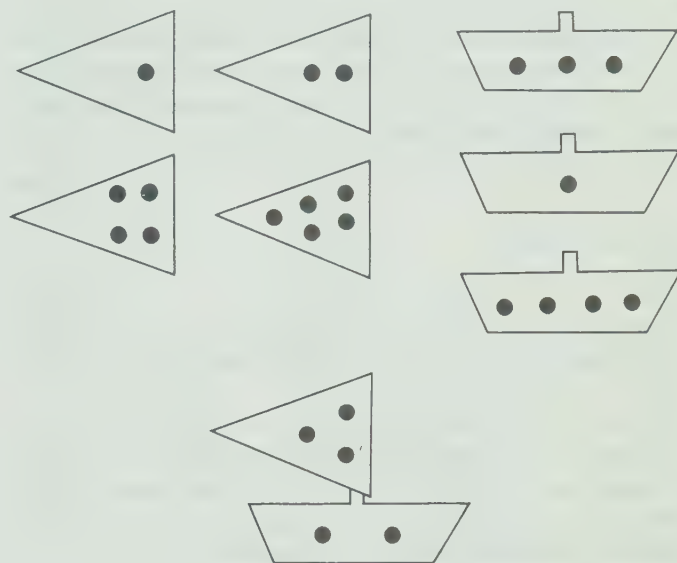
In turning up the top card, it is possible to have two or more players tie for the greatest number. The tie may be broken in one of two ways:

1. No player collects the cards. Each player retrieves her / his own card and places it at the bottom of the pile.
2. The players with matching "high" cards deal, face down, the next two cards from their piles and then turn their third cards face up. The winner of all the cards is determined by the newly exposed cards, whichever card shows the greater (greatest) number.

This game may be adapted so that the player whose card shows the lesser number wins the cards.

Building Sailboats (Activity for page 75)

Make sailboats in two pieces (boat and sail) having dots on each piece (for sums not greater than nine). Have the children put sailboats together at random and record the addition sentence for each.



$$3 + 2 = 5$$

or

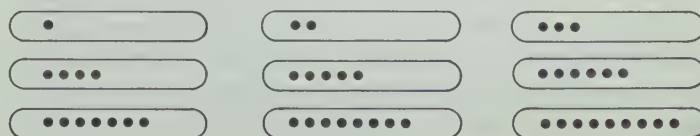
$$2 + 3 = 5$$

Poem for page 79

Slowly, slowly, very slowly creeps the garden snail.
Slowly, slowly, very slowly up the wooden rail.
Quickly, quickly, very quickly runs the little mouse.
Quickly, quickly, very quickly round about the house.

Number Sticks (Activity for page 83)

Provide the children with a supply of popsicle sticks and small gummed shapes of different colors. Have the children stick from one to nine shapes of the same color on one stick. These sticks can be used for comparing numbers and for writing addition sentences.



Unit 5 Overview

This unit provides further experiences using number sentences to represent addition of two numbers having sums to 9. From illustrations and suggested activities, the children discover that changing the order of two addends does not affect their sum (commutative property). The vertical form for addition is introduced in this unit. A series of three lessons is provided for children to show one fewer, two fewer, or three fewer members for a given set. This activity provides an easy introduction to the operation of subtraction, which is related to the removal of some members from a set. Number sentences using the symbol $-$ are used to represent subtraction. Children have opportunities to interpret illustrations and to illustrate subtraction facts with minuends to 9. The nickel and its value are presented and amounts to 9 cents are expressed using pennies and nickels. Activities are suggested for children to experience differences in the capacities of containers. Simple bar graphs are introduced as one means of showing data for comparative purposes. Pictures and drawings of three-dimensional shapes are studied and identified. The *Checkup* assesses the children's abilities in performing addition expressed in number sentences and in vertical form, and in completing subtraction sentences related to given illustrations.

Unit Outcomes

Number

- complete addition sentences for sums to 9
- change the order of two addends (commutative property)
- use the vertical form for addition
- show one, two, or three fewer members for a given set
- separate a set and relate the action to subtraction of numbers
- recognize and interpret the word *minus* and the symbol $-$
- write number sentences to show subtraction, minuends to 9
- complete subtraction sentences for minuends to 4
- illustrate subtraction sentences for minuends to 9

Measurement

- recognize a nickel and know that it is equivalent to five pennies and its value is 5 cents
- use pennies and a nickel for amounts to 9 cents
- compare containers with respect to capacity

Geometry

- make and interpret bar graphs
- identify three-dimensional shapes and recognize drawings of them

Background

Number: The use of sets in developing the operation of addition and in discovering basic addition facts makes it possible for children to learn some of the characteristic properties of addition. In this unit the children are introduced to the commutative property, which states that changing the order of two addends does not affect the sum. An understanding of this property enables children to recall addition facts more easily. It is recognized that most children can recall $8 + 1 = 9$ more easily than $1 + 8 = 9$. If the two related facts are considered together, both facts may be learned equally well, since know-

ing one fact helps in knowing the related fact. Learning about this property may help to broaden the children's understanding of the operation of addition.

The vertical arrangement of addends is introduced as an equivalent way of writing an addition sentence. Typical addition sentences are $2 + 3 = 5$, $3 + 4 = 5 + 2$, and $27 + 46 = 73$. The first two examples are simple because they involve only basic addition facts, but the third example involves not only basic facts but also a knowledge of place value in the base-ten numeration system. Since this is more complex, a more convenient arrangement of the numerals is desirable and, in anticipation of this, the vertical form is introduced now.

In *Starting Points in Mathematics I*, subtraction is used for two distinct purposes: to find the number left after removing members from a set; to compare two numbers by finding their difference. Subtraction is introduced using the first of these, known as the "take-away" approach, because it is found to be easier and occurs more frequently in children's experiences. The words "take away" are used in connection with objects; for example, "Take away 4 cars from 7 cars." (The abstract form is "Subtract 4 from 7.") The word *minus* is used with abstract numbers: we say "7 minus 4" for " $7 - 4$ ". After considerable experience in manipulating objects and removing one or more members of a set, children understand the meaning and significance of the terms and symbols used to express subtraction. As before, the symbol $=$ is emphasized as a link between different names for the same number; for example, $7 - 2$ and 5 are names for five.

Measurement: With the introduction of the nickel, it becomes possible to consider open-ended problems; that is, problems for which there is more than one acceptable solution. This parallels many real-life problems. When using money in a play store situation, there are many possible answers to questions such as: "If you have one nickel and four pennies, what can you buy? How much can you spend?" Answers depend on the prices marked on the various items and the choices made by the child. The child is involved in adding different amounts and in handling different coins. Open-ended problems should be provided as often as possible because of their value in developing the ability to make decisions. Suggestions are provided in *Related Activities* for the lesson on page 101.

Direct experience with concrete materials has been suggested in activities developing number concepts and operations, but its value cannot be overemphasized in developing concepts of measurement. Work with capacity begins in this unit. The activities outlined in the preliminary work suggest that children compare capacities of containers of various shapes and sizes. It is surprising how deceptive shape can be, even to adults – a cursory glance along the shelves of shops and supermarkets reveals many examples of packaging that take advantage of this fact. Activities involving the filling and emptying of containers of different shapes and having approximately the same capacity encourage children to focus their attention on the really important feature, the capacity.

Geometry: Children have their first introduction to graphing in this unit and the form used is the *bar graph*. A scale of one object for one unit is used because the children are familiar with one-to-one matching, and this makes the transition from concrete to abstract somewhat easier. Preliminary activities

involve children in collecting materials. Numbers are first associated with the quantities and then they are replaced by bars on graphs. Both numerals and bars are symbols, but the bars have the advantage of showing the relative sizes they represent. On page 92, the information is presented and the children color one square for each object counted. The visual presentation invites interesting comparisons to be made as the graph is interpreted through discussion.

The names of three-dimensional solids from page T6 in Unit 1 are reviewed: cone, cube, cylinder, prism, pyramid, sphere. Use your discretion in determining which names are too difficult for some children at this time. For example, you may wish to substitute the word "roller" for "cylinder". Experiences are directed toward the characteristics of each type of solid. The children discover which solids roll and which tend to slide, which shapes are suggested by faces of a solid, and how many faces there are on each shape. By selecting one or more features, children sort and classify solids as being similar or dissimilar. By tracing around the faces, they can establish relationships between two-dimensional shapes and three-dimensional shapes.

Teaching Strategies

If grouping for instruction in previous units has produced different rates of progress, the practice should be continued, particularly for topics that deal with number. Some children may require counters to obtain the sums for addition exercises, and they should be encouraged to use them. It is suggested that a set of counters should be readily available for each child so that there is no need to use fingers and other devices that might not be discarded at later stages. At the same time, children should be encouraged to learn the addition facts and to attempt some of the exercises without using counters. Children who have mastered the facts may wish to use the counters to check their work.

A play store is recommended for the work with the nickel and pennies. Most children will be able to recognize the coins, but they may not have had experiences combining them to make desired amounts. The play store provides a pleasant and informal atmosphere for such experiences. If this is the first time the children have had a play store, you may introduce it and the procedures to be followed, either to the whole class or to small groups. The children should then be allowed to use the store either at scheduled times or in their free time. Probably both arrangements will be necessary for all the children to share in the activity.

A "shape table" may be set up in one part of the classroom before the work in this unit is formally begun. Give children several days advance notice to bring objects from home that resemble the three-dimensional shapes. They will have an opportunity to examine and sort the shapes while you provide questions to challenge them.

Similarly, a "capacity table" may be set up before the work in this unit is begun. The organization of the classroom may permit a water table or a sand table for filling and pouring. However, other materials such as rice, peas, and beans work just as well. The essential thing is to provide children with the opportunity for both free play and directed activities. For the latter, activity cards may be used to suggest which containers to use. Color coding the containers will simplify recording the results.

Materials

display board and cutouts
 items for making sets, devices for set holders
 Unifix cubes, colored beads or blocks
 two sets of dominoes, domino cards
 counters for each child
 numeral cards for 0 to 9
 number concept cards for 0 to 9 for each child
 a chart for making a graph
 crayons for each child
 flash cards for the word *minus* and the word *equals*
 real money, play money, coin cutouts from copies of page T337
 items with tags showing prices from 1¢ to 9¢ for the play store
 containers that suggest cones, cubes, cylinders, prisms, spheres
 sets of wooden or plastic three-dimensional shapes
 containers of various sizes for capacity
 materials for filling containers: peas, beans, rice, shells, sand, water
 instruments for filling containers: spoons, scoops, funnels
 overhead projector
 colored transparent bingo chips

Vocabulary

sum	pyramid
vertical form	sphere
graph	minus (—)
nickel	subtract
same value	subtraction
surface	subtraction sentence
cone	holds more than
cube	holds less than
cylinder	holds about the same
prism	

Unit 5 Theme – Foods

The purpose of this theme is to enable children to identify and name correctly a variety of common foods and to become aware that our food comes in many forms (dried, frozen, fresh, processed) from all over the world.

Set up a display to encourage interest in different kinds of foods. Place mounted pictures of food from magazines on a wall or on charts. Arrange illustrated cookbooks and other books about foods on a table. Fruit baskets, spray-painted in bright colors, or wicker baskets make ideal containers for a collection of fruits and vegetables. If possible, purchase items that are not quite ripe so that they will last about a week. Include canned and packaged foods, some of which the children may not have tasted before.

LANGUAGE ACTIVITIES

Plan discussion periods to examine some aspects of fresh and packaged foods. During the discussions many points on nutrition may be made incidentally. These discussions will also develop oral vocabulary as new foods are named and sight vocabulary as the names of these foods are recorded.

The children can benefit from the correct use of words when talking about food or the preparation of food. Record words in categories as they occur. Some of these categories may be ingredients (spices, herbs), actions (beat, dice, mix, scrape), size (small, large, bite-sized), quantity (half, dozen, bunch, pinch), shape (round, square, oval), temperature (chilled, steaming, boiling), time (quickly, slowly, gradually), texture (smooth, crisp, moist), flavor (bitter, tart, mild, strong, salty).

1. Touching Foods

Select a variety of fresh fruits and vegetables with skins of different textures. A pineapple, a lemon, a carrot, an apple, a grape, a turnip, and a stalk of broccoli would be a good selection. Sketch each item on chart paper as the children name it. Let the children handle each item. Record beside each sketch the words that the children suggest to describe the texture of the skin.

When the chart is completed, have each child in turn make a statement using one of the words. Point to a sketch and a word. The child must locate the correct fruit or vegetable and respond with a statement; for example, “The pineapple is prickly.”

You may wish to extend this activity by blindfolding children in turn. Have other children suggest a fruit or a vegetable that the blindfolded child must locate by touch.

2. Smelling Foods

Choose several fruits and vegetables having characteristic smells. Have the children smell each one. Sketch each item on chart paper and record the comments about each smell. As each fruit or vegetable is displayed, have the children read the comments together.

Have the children take turns closing their eyes and identifying the items by smell.

Challenge the children with questions similar to the following:

“Which have more noticeable smells – fruits or vegetables?”

“Which items have similar smells?”

“What other things have some of these smells?”

3. Tasting Foods

Select six fruits and vegetables having distinctive flavors. Cut these into bite-sized pieces and arrange them on paper plates. Record the name of each item on chart paper. Record the words that the children use to describe the taste of each fruit or vegetable. Have the children suggest other items that might be described by these taste words. Have the children think of tastes that are not represented by the selected fruits and vegetables.

Review the taste words suggested above. Ask the children what part of the body we use to taste things. Most children will suggest that taste is in the mouth. Suggest that other parts of the body affect our impression of how something tastes. The following two experiments will help to illustrate this point.

- a. Choose foods that are similar in texture but not in taste.

Have several children close their eyes and taste a sample. Ask if it is easy or difficult to describe the taste when they cannot see the food.

- b. Select the same foods as in the first experiment. Have the children close their eyes and hold their noses. Ask if smell affects the taste.

4. Writing a Story

Discuss the foods that the children have been working with from a nutritional point of view. Point out how these foods affect such things as bones, muscles, vision, strength, and energy levels. Have the children help you write a story on chart paper telling why we should choose certain foods if we wish to have strong bodies.

MATHEMATICS ACTIVITIES

1. Setting a Table

Collect plastic dishes and cutlery from fast-food outlets. Use these to show the children how to set places at a table. This activity will reinforce one-to-one correspondence and lateral perception.

2. Classifying

Have the children examine the foods on display and group them in several ways. Ask the children to name other ways of classifying food. Their suggestions may include these:

fruits / vegetables

hard / soft

cooked / raw

peeled before eaten / not peeled before eaten

Choose three of the classifications and print these on three large charts. Have the children cut pictures of food from magazines to illustrate each classification.

3. Graphing

Discuss with the children the various kinds of things they ate for breakfast. Make a list on chart paper of the things, for example, cereal, toast, eggs, orange juice, milk. By a show of hands make a survey of how many children ate each item. Place a gummed shape beside the name of each item to represent one child. When the graph is completed, encourage the children to make some observations from the information shown on the graph. They may make observations similar to the following:

Most children had orange juice.
 Few children had eggs.
 More children had toast than cereal.
 Fewer children had milk than orange juice.

4. Recognizing Three-Dimensional Shapes

Refer again to the foods on display. Have the children examine the shape of each item and sort the items according to similar shapes. Encourage the children to identify the shapes by name.

5. Heavier Than – Lighter Than

Have the children hold an item in each hand. Ask each child to make a statement comparing the masses of the two items; for example, “The lemon is heavier than the grape.” When the children have had experience with this idea, let them work with the foods and write sentences making comparisons. The list of foods from Language Activity 1 will be a reference for correct spelling.

6. Playing Store

Using the items in the display of foods and any boxes or cans that the children bring from home, set up a store in a corner of the classroom. Attach prices to the items and let children take turns purchasing things from the store. If possible, have the children use real money.

7. Solving Problems

Write a number sentence on the chalkboard. Have children illustrate the number sentence by telling a story about a favorite fruit or vegetable. For example, for $4 - 1 = 3$, a child might say, “I had four apples. I ate one apple. I have three apples left.”

SCIENCE ACTIVITIES

1. Good Nutrition

Discuss why it is important to have healthy bodies. Record the responses of the children on a chart. Explain to the children that there are groups of foods that help different parts of our bodies. As you introduce proteins, fats, and carbohydrates, have pictures ready or use real foods to illustrate members of each group. Give simple explanations of the nutritional function of each group.

Proteins build and repair muscles, skin, hair, and other tissues.

Fats provide energy and keep the skin healthy.

Carbohydrates provide heat and energy.

Minerals build strong bones and teeth.

Vitamins keep our eyes and skin healthy and increase our resistance to infection.

From this discussion try to make the children aware of the relationship between good nutrition and healthy bodies.

2. An Experiment

Review briefly the three nutritional groups of food discussed in the previous activity. Have the children name some of the foods that are classed as carbohydrates.

If starch is present in a food, iodine will turn blue when dropped on a raw surface of that food. Show the reddish brown liquid and explain this fact to the children. Test various foods to see whether starch is present. Record the findings of this experiment on a chart.

3. Parts of Plants

Point out to the children that all the fruits and vegetables on display come from different parts of a plant. Introduce the terms *leaf*, *stalk*, *fruit*, *root*, and *seed*. Have the children suggest one or more items for each category, for example, leaf – spinach, stalk – celery, fruit – apple, root – carrot, seed – bean.

4. Things Aren't Always What They Seem

Review with the children the idea that sight and smell affect the taste of food. Suggest that sometimes foods that don't seem to go together can be a surprise when tasted together. Read the following recipe to the children and have them predict how it will taste.

Recipe

Peel, core, and slice three apples.

Peel and slice three onions.

Place the apples and onions in a pan with three teaspoons of oil.

Fry the mixture until it is soft and golden.

Sprinkle the mixture with cloves, cinnamon, and sugar to taste.



After the mixture is cooked and sampled, compare the children's reactions with their predictions. Were the children surprised?

5. Bean Sprouts

Try to grow some bean sprouts for the class to enjoy. Keep a record in words and pictures of the day-to-day procedure. You will need about half a cup of mung beans, a clean wide-mouthed jar, cheesecloth, a piece of string or a rubber band, and clean water.

Put about a tablespoon of beans in the bottom of the jar. Fill the jar with water and cover the top of the jar with cheesecloth. Secure the cheesecloth with the string or the rubber band. Shake the jar and pour off all the water without removing the cheesecloth. Place the jar on its side in a dark place. Each day, pour cold water through the cheesecloth to rinse off the beans, and then pour off the water. Small green leaves will begin to show in five to seven days. Remove the sprouted beans from the jar before the sprouts become too long. Use the sprouts to make sandwiches for the children to enjoy.

SOCIAL STUDIES ACTIVITIES

1. Sources of Foods

Using the canned and packaged items from the display of foods, find the place of origin of each product. Point out these places on a map of the world and make the children aware that our food comes from all over the world. You may wish to explore questions similar to the following:

“How does this food get to Canada?”

“Why don't we grow some of these foods in Canada?”

“Why do we buy from other countries foods that do not grow in Canada?”

2. Foods of Other Countries

Ask the children the following question:

“If a family came to visit from another country, which foods would they tell their friends about when they returned home?”

Try to establish which foods are considered “Canadian”. Point out that some other countries have special foods. Lead the children to suggest some of these special foods. This will be especially successful if there are children of different ethnic groups in the class. The children may suggest associations similar to the following:

Italy – spaghetti
China – rice, tea
West Indies – mangoes, fish
England – fancy cookies
Greece – figs, olives
Brazil – coffee
Holland – cheese
Hawaii – pineapple, coconuts

ART ACTIVITIES

1. Vegetable Prints

Vegetables such as potatoes, carrots, parsnips, and turnips are ideal for making “stamps” for printing patterns based on shapes. Cut the vegetables into convenient sizes for the children to handle. Have the children use a table knife for cutting away the edges as they make a shape or a design. These “stamps” can then be dipped in tempera paint and “printed” on a piece of paper. Have the children experiment with the printing technique and then print patterns or designs on large sheets of paper. Later you may wish to have the children make patterns or designs based on a given number of shapes.

2. Fabric Collage

Have the children cut out the shapes of fruits and vegetables from scraps of fabric. These shapes can be arranged in a fruit bowl, also cut from fabric. The bowl of fruits and vegetables can be glued on either a paper or fabric backing. Instead of gluing the shapes in a fruit bowl, they can be arranged on the paper or fabric in a particular design.

3. Eggshell Designs

Crush clean eggshells and color them with food coloring or tempera paint. Have children spread glue in interesting designs on their papers and sprinkle colored bits of eggshell over the glue. Pictures can also be made in this way by “drawing” with the glue and then sprinkling the eggshells in the shapes of the objects desired.

4. Spicy Pomanders

Oranges when studded with cloves make fragrant pomanders for hanging in clothes closets. Some children may wish to make them as gifts for their mothers.

About a quarter of a cup of cloves will be required for each pomander. Have the children punch holes in each orange with their pencils. Each hole should be just large enough to place a clove in. The cloves should be placed as close together as possible so that when the fruit dries none of the skin will be visible. After the orange has been studded, roll it in spices such as nutmeg, cinnamon, or allspice. Let the orange dry exposed to the air for at least two weeks. The oranges can also be dried in an oven at 150°C for about four hours. After the oranges are dry, tie each one with yarn or ribbon to form a hanger.

MOVEMENT ACTIVITIES

1. Roll or Run

Ask the children to name fruits or vegetables that are round and will roll. The children may suggest apples, oranges, turnips, and cabbages.

Let the children run, skip, hop, or move in any way they wish while you call out the names of fruits and vegetables. When a round fruit or vegetable is named, all the children must get down on the floor and roll.

2. Tip the Fruit Basket

Have the children sit to form a large circle. Assign the name of a fruit to pairs of children. Choose one player to be IT. When you call out the name of a fruit, the two players assigned that fruit must change places. At this time IT tries to sit in one of the two places. The remaining player now becomes IT. If you say “Tip the fruit basket”, all the players change places.

3. Pizza Pie

Divide the class into groups of five. Give each group one of the following names and instructions:

Green peppers, hop on one foot.
Mushrooms, hop on two feet.
Onions, skip.
Cheese, slide on the floor.
Pepperoni, roll on the floor.
Tomatoes, move backward.

Have all the players form a circle in the centre of the gym. This is the “pizza”. As each ingredient is called out, the members of that group begin moving around the gym. When you call out “pizza pie”, all the players quickly return to the centre and take their places in the circle. It is not necessary to call all the ingredients each time, but it is important to call them at random.

4. Potato Race

Divide the class into teams of four or five players. Give each child a potato. Each child must walk from the starting point to the finish line with the potato on the top of her / his shoe. If the potato falls off, it may be put back. The first player in each team to cross the finish line is the winner for that team.

MUSIC ACTIVITIES

1. Popcorn Music

Suggest to the children that there is something we like to eat that makes music while it cooks. This musical food is popcorn.

Pop some popcorn with the children and have them listen to the “music”. After the children have eaten the popcorn have them compose a popcorn song.

2. Personalized Maracas

Children may enjoy making either a single maraca or a pair of maracas for a rhythm band.

For each maraca you will need a well-washed 250 mL milk carton, a popsicle stick, tape, glue, and seeds such as dried beans or peas. Pour about a tablespoon of seeds into the carton and tape the top of the carton closed. Glue the popsicle stick to one side of the milk carton so that at least half the stick projects at the bottom to be used as a handle.

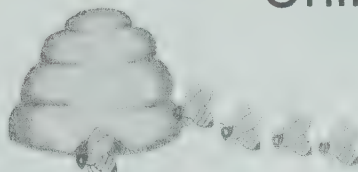
The children may cover their maracas with construction paper and decorate them with pictures and paint.

Complete the number sentences.

Unit 5



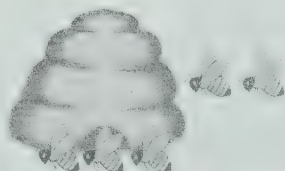
$$2 + 3 = 5$$



$$1 + 4 = 5$$



$$0 + 5 = 5$$



$$3 + 2 = 5$$

$$1 + 3 = 4$$

$$4 + 0 = 4$$

$$5 + 0 = 5$$

$$2 + 1 = 3$$

$$1 + 1 = 2$$

$$4 + 1 = 5$$

$$3 + 1 = 4$$

$$1 + 0 = 1$$

$$0 + 1 = 1$$

$$4 + 1 = 5$$

$$2 + 0 = 2$$

$$3 + 2 = 5$$

$$3 + 2 = 5$$

$$2 + 2 = 4$$

$$0 + 3 = 3$$

$$2 + 3 = 5$$

$$1 + 4 = 5$$

$$2 + 2 = 4$$

$$3 + 0 = 3$$

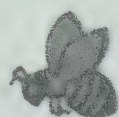
$$1 + 2 = 3$$

$$2 + 3 = 5$$

$$0 + 5 = 5$$

$$0 + 4 = 4$$

$$0 + 2 = 2$$



Adding, sums to 5

(eighty-five) 85

LESSON OUTCOME

Complete addition sentences for sums to 5

Materials

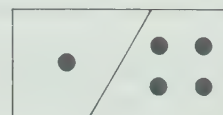
objects of different colors, display board and cutouts, counters for each child

Vocabulary

sum

RELATED ACTIVITIES

- Have the children use five counters and a sheet of paper marked into two parts to make two sets, for example, a set of one and a set of four.



Ask them to state or write the corresponding addition sentence; that is, "One plus four equals five." Discuss as many of the number combinations as possible.

- Read the limerick on page T137. Ask the children if the old man was right about the answer for adding two and two.
- You may wish to read again the poem about the bees on page T50.

LESSON ACTIVITY

Before Using the Page

- Display two red blocks. Ask the children how many blocks there are. Then display three blue blocks. Ask how many blocks there are altogether. Ask one child to state the addition sentence ($2 + 3 = 5$) and another child to write it on the chalkboard.

Remove all the blocks and display the three blue blocks first. Ask how many blocks there are. Then display the two red blocks. Ask how many blocks there are altogether. Ask one child to state the addition sentence ($3 + 2 = 5$) and another child to write it on the chalkboard. Repeat the procedure for sets of 1 and 4 and for sets of 0 and 5.

- Place a set of two cutouts and a set of three cutouts on the display board. As the children state the number of each set, write $2 + 3 = \underline{\quad}$ on the chalkboard. Ask what number completes the addition sentence. Refer to five as the *sum* of two and three.

Repeat for other number combinations for 5 and have the

children complete addition sentences in the following forms:

$$\begin{array}{r} 1 + \underline{\quad} = \underline{\quad} \\ \underline{\quad} + 1 = \underline{\quad} \\ \underline{\quad} + \underline{\quad} = \underline{\quad} \end{array}$$

- Write an addition sentence on the chalkboard (sum of 5 or less) and have children use their counters to illustrate it. Repeat several times for other addition sentences, some of which have zero as one of the addends.

Using the Page

- Direct the children's attention to the bees at the bottom of the page. Ask how many brown bees there are, how many yellow bees there are, and how many bees there are altogether. Tell the children that this page is about sums to 5. Have the children interpret in their own words the action shown for the first hive; for example, "There are two bees in front of the hive. Three bees are flying toward the hive. There are five bees altogether." Have the children trace over the dotted 5. Discuss the second exercise in a similar way and then let the children work on their own.

LESSON OUTCOME

Recognize that the order of the addends does not affect the sum

Materials

Unifix cubes, display board and cutouts, counters for each child

RELATED ACTIVITIES

- Have the children use colored beads or blocks to obtain the possible number combinations for 4 and 5. Have them record the combinations and then draw lines to show the pairs that name the same number.



- Have the children refer to the three columns of addition sentences on page 85. Give them instructions for indicating the pairs of addition sentences in which the order of the numbers is changed; for example, they might underline in red $1 + 3 = 4$ and $3 + 1 = 4$, underline in blue $2 + 1 = 3$ and $1 + 2 = 3$, and so on. Encourage the children to try to find nine pairs.

Complete.



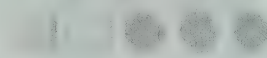
$$2 + 1 = 3$$



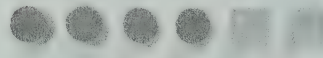
$$1 + 2 = 3$$



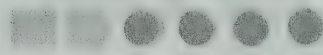
$$3 + 2 = 5$$



$$2 + 3 = 5$$



$$4 + 2 = 6$$



$$2 + 4 = 6$$



$$2 + 7 = 9$$



$$7 + 2 = 9$$



$$3 + 6 = 9$$



$$6 + 3 = 9$$



$$5 + 4 = 9$$



$$4 + 5 = 9$$

Complete each addition sentence.

86 (eighty-six)

Changing the order of addends for addition

LESSON ACTIVITY

Before Using the Page

- Place three red cubes and two blue cubes in a row. Ask the children how many cubes there are of each color and how many there are altogether. Have a child say, "There are three red cubes and two blue cubes. Altogether there are five cubes. Three plus two equals five." Ask a child to write the addition sentence on the chalkboard. Ask another child to interchange the red cubes and the blue cubes. Repeat the previous questions. Have a child say, "There are two blue cubes and three red cubes. Altogether there are five cubes. Two plus three equals five." Ask a child to write the addition sentence on the chalkboard. Ask the children what they notice about the two addition sentences ($3 + 2$ and $2 + 3$ name the same number). Repeat the procedure, using different numbers of colored cubes.
- Place seven cutouts on the display board. Ask one child to separate the cutouts into a set of four and a set of three. Have a child state, "Four plus three equals seven." Ask another child

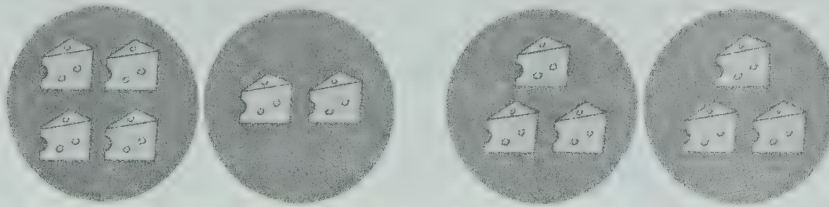
to write the addition sentence on the chalkboard. Ask a third child to interchange the two sets, showing a set of three and a set of four. Ask another child to write the addition sentence on the chalkboard. Ask if the number of cutouts in the two sets together has changed. Repeat the procedure with different numbers of cutouts.

- Have the children show two counters and then four more counters. Ask how many counters there are. Then have the children start with four counters and include two more counters. Ask how many counters there are in this group. Repeat with other sets of counters. Ask children to explain why the number of counters in each pair is the same.

Using the Page

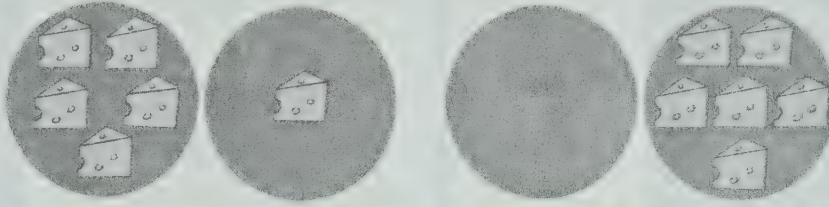
- Discuss the two addition sentences in the first exercise with the children and have them trace over the two dotted 3's. For the fourth exercise, have the children copy the shapes to illustrate that $2 + 7$ and $7 + 2$ name the same number. In the sixth exercise, have the children illustrate that $5 + 4$ and $4 + 5$ are names for nine.

Complete the number sentences.



$$4 + 2 = 6$$

$$3 + 3 = 6$$



$$5 + 1 = 6$$

$$0 + 6 = 6$$

$$2 + 1 = 3$$

$$1 + 3 = 4$$

$$2 + 4 = 6$$

$$2 + 3 = 5$$

$$5 + 0 = 5$$

$$1 + 1 = 2$$

$$1 + 5 = 6$$

$$1 + 2 = 3$$

$$3 + 2 = 5$$

$$2 + 2 = 4$$

$$1 + 4 = 5$$

$$0 + 6 = 6$$

$$3 + 1 = 4$$

$$3 + 3 = 6$$

$$5 + 1 = 6$$

$$2 + 4 = 6$$

$$0 + 6 = 6$$

$$1 + 5 = 6$$

$$4 + 2 = 6$$

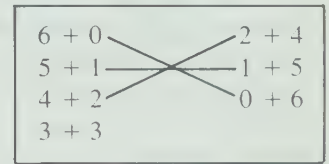
$$6 + 0 = 6$$

$$4 + 0 = 4$$

$$5 + 1 = 6$$

$$4 + 1 = 5$$

$$0 + 3 = 3$$



- Have the children refer to the three columns of addition sentences on the page. Have them identify pairs of addition sentences in which the order of the numbers is changed as suggested on page T116. Encourage the children to try to find eight pairs.

Adding, sums to 6

(eighty-seven) 87

LESSON ACTIVITY

Before Using the Page

- Display two red blocks. Ask the children how many blocks there are. Then display four blue blocks. Ask how many blocks there are altogether. Ask one child to state the addition sentence ($2 + 4 = 6$) and another child to write it on the chalkboard.

Remove all the blocks and display the four blue blocks first. Ask how many blocks there are. Then display the two red blocks. Ask how many blocks there are altogether. Ask one child to state the addition sentence ($4 + 2 = 6$) and another child to write it on the chalkboard.

Repeat the procedure for sets of 1 and 5, sets of 3 and 3, and sets of 0 and 6.

- Place a set of two cutouts and a set of four cutouts on the display board. As the children state the number of each set, write $2 + 4 = \underline{\quad}$ on the chalkboard. Ask what number completes the addition sentence. Refer to *six* as the sum of two and four.

Repeat for other number combinations for 6 and have the children complete addition sentences for sums of 6 in the following forms:

$$\begin{array}{l} 1 + \underline{\quad} = \underline{\quad} \\ \underline{\quad} + 1 = \underline{\quad} \\ \underline{\quad} + \underline{\quad} = \underline{\quad} \end{array}$$

- Write an addition sentence on the chalkboard (sum of 6 or less) and have children use their counters to illustrate it. Repeat several times for other addition sentences, some of which have zero as one of the addends.

Using the Page

- Direct the children's attention to the crackers at the bottom of the page. Ask how many there are. Tell the children that this page is about sums to 6. Ask how many pieces of cheese there are in the first set, how many pieces of cheese there are in the second set, and how many pieces of cheese there are altogether. Have the children trace over the dotted 6. Discuss the second exercise in a similar way and then let the children work on their own.

LESSON OUTCOME

Complete addition sentences for sums to 7

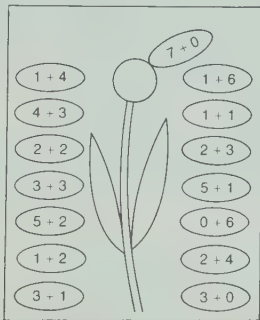
Materials

counters for each child, two sets of numeral cards for 0 to 7

RELATED ACTIVITIES

- Make a work sheet for each child as shown. Have the children cut out all the petals for the flower that have a sum of 5, 6, or 7. Leave the petals that do not have a sum of 5, 6, or 7. The petals that have been cut out are to be pasted in position to complete the flower. When all the petals have been pasted on, you may wish to have the children color the petals according to these instructions:
 "Color yellow all the petals for six."
 "Color red all the petals for seven."

After the children have colored the petals, ask questions similar to these:
 "How many petals are yellow?"
 "How many petals are red?"
 "How many petals are not colored?"
 "How many petals are there for five?"



Complete the number sentences.

$$2 + 1 = \underline{3}$$

$$1 + 3 = \underline{4}$$

$$5 + 1 = \underline{6}$$

$$1 + 5 = \underline{6}$$

$$3 + 2 = \underline{5}$$

$$1 + 6 = \underline{7}$$

$$2 + 4 = \underline{6}$$

$$7 + 0 = \underline{7}$$

$$3 + 3 = \underline{6}$$

$$0 + 5 = \underline{5}$$

$$5 + 2 = \underline{7}$$

$$2 + 5 = \underline{7}$$

$$1 + 4 = \underline{5}$$

$$4 + 1 = \underline{5}$$

$$6 + 0 = \underline{6}$$

$$4 + 3 = \underline{7}$$

$$3 + 4 = \underline{7}$$

$$1 + 2 = \underline{3}$$

$$6 + 1 = \underline{7}$$

$$3 + 1 = \underline{4}$$

$$0 + 2 = \underline{2}$$

$$2 + 3 = \underline{5}$$

$$1 + 1 = \underline{2}$$

$$4 + 2 = \underline{6}$$

$$2 + 0 = \underline{2}$$

$$3 + 4 = \underline{7}$$

$$3 + 3 = \underline{6}$$

$$1 + 4 = \underline{5}$$

$$3 + 0 = \underline{3}$$

$$2 + 3 = \underline{5}$$

$$1 + 6 = \underline{7}$$

$$1 + 0 = \underline{1}$$

$$0 + 4 = \underline{4}$$

$$2 + 5 = \underline{7}$$

$$2 + 4 = \underline{6}$$

$$4 + 3 = \underline{7}$$

88 (eighty-eight)

Adding, sums to 7

LESSON ACTIVITY

Before Using the Page

- Make up a story problem; for example, "Three birds came to the feeding station and then four more came. How many birds were there at the feeding station?"

Have the children display a set of three counters and a set of four counters to represent the birds. Then ask how many birds there are altogether. Ask a child to write the addition sentence on the chalkboard. Repeat the problem using other number combinations for sums of 7 (2 and 5, 1 and 6, 0 and 7).

- Ask one child to suggest a story problem, a second child to state the addition sentence, and a third child to write the addition sentence on the chalkboard. (Note that the sums should be 7 or less.) Have as many children as possible make up a story problem.

- Hold up a numeral card in each hand, for example, 5 and 2. Ask a child to state the addition sentence: "Five plus two equals seven." Cross your arms so that the cards now show the order 2 and 5. Ask a child to state the addition sentence: "Two

plus five equals seven." Repeat for the other number combinations for 7.

Using the Page

- Direct the children's attention to the cookies at the side of the page. Ask how many cookies there are. Tell the children that this page is about sums to seven. Have the children complete the number sentences while you observe how they work and the speed at which they work. Note the children who use objects for counting, those who count on from the first number, and those who have already memorized the sums. Encourage the children who are using counters to try to complete some addition sentences without them.

- After the children have completed the page, have them ring all the addition sentences with sums of 7. Have them list the possible number combinations for 7. Challenge them to find the addition sentence with a sum of 7 that is missing from the three columns of exercises.

Complete the number sentences.

LESSON OUTCOME

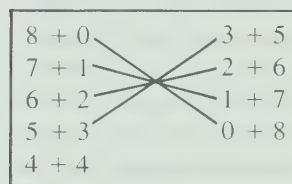
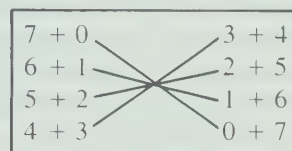
Complete addition sentences for sums to 8

Materials

two sets of dominoes, display board and cutouts, counters for each child

RELATED ACTIVITIES

- Have the children use colored beads or blocks to obtain the possible number combinations for 7 and 8. Have them record the combinations and then draw lines to show the pairs that name the same number.



Have the children ring all the addition sentences with sums of 8 on page 89 to determine whether all the possible number combinations for a sum of 8 are given.

$2 + 3 = 5$	$2 + 2 = 4$	$7 + 0 = 7$
$5 + 2 = 7$	$1 + 3 = 4$	$4 + 4 = 8$
$4 + 0 = 4$	$2 + 4 = 6$	$1 + 6 = 7$
$1 + 7 = 8$	$6 + 2 = 8$	$7 + 1 = 8$
$3 + 3 = 6$	$3 + 2 = 5$	$1 + 7 = 8$
$6 + 1 = 7$	$0 + 8 = 8$	$5 + 3 = 8$
$4 + 3 = 7$	$5 + 1 = 6$	$3 + 5 = 8$
$2 + 6 = 8$	$2 + 5 = 7$	$3 + 4 = 7$
$1 + 5 = 6$	$1 + 4 = 5$	$0 + 5 = 5$
$4 + 2 = 6$	$3 + 5 = 8$	$6 + 2 = 8$
$3 + 1 = 4$	$4 + 4 = 8$	$1 + 2 = 3$
$8 + 0 = 8$	$4 + 1 = 5$	$2 + 1 = 3$

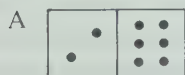
Adding, sums to 8

(eighty-nine) 89

LESSON ACTIVITY

Before Using the Page

- Display the domino shown (A).



Ask how many dots there are on the left part, how many dots there are on the right part, and how many dots there are altogether. Ask one child to state the addition sentence that the domino illustrates ($2 + 6 = 8$). Ask another child to find the domino in the second set that matches the first domino. Ask the child to place it next to the first one as shown (B). Ask a child to state the addition sentence that the second domino illustrates ($6 + 2 = 8$). Repeat the procedure using the dominoes for 3 and 5, and 4 and 4. Discuss the fact that there is only one addition sentence when the two numbers are the same.

For a variation of this activity, use only one set of dominoes and turn a domino around to obtain the second arrangement of dots.

- Place eight cutouts on the display board. Ask children in turn to separate them into two sets to illustrate the nine possible number combinations for a sum of 8. As each number combination is illustrated, ask other children in turn to write the corresponding addition sentence on the chalkboard.

- Write an addition sentence on the chalkboard (sum of 8 or less) and have children use their counters to illustrate it. Repeat several times for other addition sentences.

Using the Page

- Direct the children's attention to the cookies at the side of the page. Ask how many cookies there are. Tell the children that this page is about sums to 8. You may wish to have the children complete the number sentences according to their choice of order or according to your instructions.

- After the children have completed the page, have several children present a story problem for addition sentences selected from the page. For example, for the first exercise, a child might say, "Tim ate two cookies and I ate three cookies. Together we ate five cookies."

LESSON OUTCOME

Complete addition sentences for sums to 9

Materials

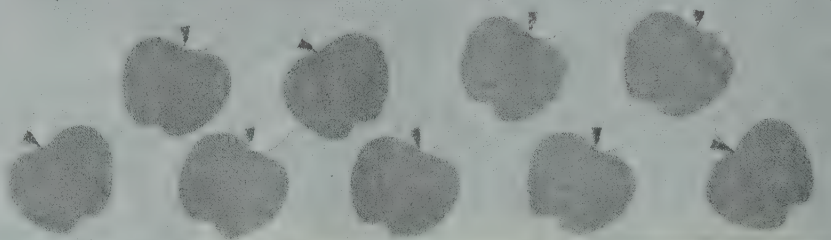
number concept cards for 0 to 9 and nine counters for each child

RELATED ACTIVITIES

- Adapt a copy of page T345 to prepare a work sheet that will include all the addition facts with sums to 9. Give a copy to each child. Using a large display copy of the chart, point first to the 2 in the left column and then to the symbol +. Finally, point to the 4 in the top row. Write $2 + 4$ on the chalkboard, and again point to the symbols in order on the chart. Ask the children what number $2 + 4$ names. Ask one child to locate the square on the chart in which the 6 is to be printed. Repeat with other examples until the children appear able to continue without help. Encourage the children to complete as much of the chart as possible without using their counters.

+	0	1	2	3	4	5
0						
1						
2					6	
3						
4						
5						

Complete the number sentences.



$3 + 2 = 5$

$5 + 2 = 7$

$7 + 1 = 8$

$2 + 4 = 6$

$1 + 5 = 6$

$3 + 3 = 6$

$8 + 1 = 9$

$5 + 4 = 9$

$1 + 7 = 8$

$6 + 2 = 8$

$2 + 5 = 7$

$3 + 4 = 7$

$7 + 2 = 9$

$1 + 3 = 4$

$3 + 6 = 9$

$4 + 5 = 9$

$1 + 8 = 9$

$4 + 2 = 6$

$6 + 3 = 9$

$3 + 6 = 9$

$1 + 4 = 5$

$0 + 5 = 5$

$4 + 4 = 8$

$5 + 3 = 8$

$2 + 6 = 8$

$3 + 5 = 8$

$1 + 6 = 7$

$4 + 3 = 7$

$2 + 7 = 9$

$7 + 2 = 9$

$4 + 1 = 5$

$9 + 0 = 9$

$2 + 3 = 5$

$6 + 1 = 7$

$1 + 8 = 9$

$5 + 1 = 6$

$2 + 2 = 4$

$8 + 0 = 8$

$4 + 5 = 9$

$5 + 4 = 9$

$3 + 1 = 4$

$6 + 3 = 9$

90 (ninety)

Adding, sums to 9

LESSON ACTIVITY

Before Using the Page

- Choose nine children to form one group. Tell them that you are going to call out two numbers (sums of 9), and they are to form two groups. For example, if you call out 3 and 6, three children will form one group and six children will form the second group. Ask a tenth child to state the number in each group and to write the addition sentence on the chalkboard. Repeat the procedure for groups of 1 and 8, 2 and 7, 4 and 5, and 0 and 9.
- Have the children use their number concept cards and nine counters. Call out two numbers, for example, 2 and 5. The child who first holds up the number concept card for 7 calls out the first number for the next round. The second number for each round should be called out by you to ensure that sums are not greater than 9.

Using the Page

- Direct the children's attention to the apples at the top of the page. Ask how many apples there are. Tell the children that

this page is about sums to 9. Have the children choose their own order to complete the number sentences or have them complete the sentences according to your instructions; for example, the first nine exercises in the second set might be completed first. You might ask the children to complete first those exercises for which they know the sums from memory. Observe whether the children can work independently or whether they need to refer to their counters for help in completing many number sentences. The children who do not need counters may wish to use the apples at the top of the page to check their work.

- After the children have completed the page, have them ring two sets of apples at the top of the page to indicate which number combination for 9 they find the most difficult.
- State story problems and have the children ring the number sentence that each story illustrates. For example, "Bill has two apples. Alice has four apples. Which number sentence in the first set shows how many apples they have altogether?"



$\begin{array}{r} 1 \\ +4 \\ \hline 5 \end{array}$	$\begin{array}{r} 2 \\ +5 \\ \hline 7 \end{array}$	$\begin{array}{r} 4 \\ +3 \\ \hline 7 \end{array}$	$\begin{array}{r} 7 \\ +1 \\ \hline 8 \end{array}$	$\begin{array}{r} 3 \\ +5 \\ \hline 8 \end{array}$	$\begin{array}{r} 4 \\ +1 \\ \hline 5 \end{array}$
$\begin{array}{r} 6 \\ +0 \\ \hline 6 \end{array}$	$\begin{array}{r} 8 \\ +1 \\ \hline 9 \end{array}$	$\begin{array}{r} 7 \\ +2 \\ \hline 9 \end{array}$	$\begin{array}{r} 4 \\ +2 \\ \hline 6 \end{array}$	$\begin{array}{r} 3 \\ +3 \\ \hline 6 \end{array}$	$\begin{array}{r} 9 \\ +0 \\ \hline 9 \end{array}$
$\begin{array}{r} 2 \\ +6 \\ \hline 8 \end{array}$	$\begin{array}{r} 6 \\ +1 \\ \hline 7 \end{array}$	$\begin{array}{r} 1 \\ +7 \\ \hline 8 \end{array}$	$\begin{array}{r} 6 \\ +3 \\ \hline 9 \end{array}$	$\begin{array}{r} 4 \\ +5 \\ \hline 9 \end{array}$	$\begin{array}{r} 5 \\ +2 \\ \hline 7 \end{array}$
$\begin{array}{r} 4 \\ +4 \\ \hline 8 \end{array}$	$\begin{array}{r} 5 \\ +0 \\ \hline 5 \end{array}$	$\begin{array}{r} 5 \\ +4 \\ \hline 9 \end{array}$	$\begin{array}{r} 4 \\ +0 \\ \hline 4 \end{array}$	$\begin{array}{r} 0 \\ +9 \\ \hline 9 \end{array}$	$\begin{array}{r} 3 \\ +6 \\ \hline 9 \end{array}$
$\begin{array}{r} 3 \\ +4 \\ \hline 7 \end{array}$	$\begin{array}{r} 5 \\ +3 \\ \hline 8 \end{array}$	$\begin{array}{r} 1 \\ +5 \\ \hline 6 \end{array}$	$\begin{array}{r} 2 \\ +7 \\ \hline 9 \end{array}$	$\begin{array}{r} 6 \\ +2 \\ \hline 8 \end{array}$	$\begin{array}{r} 3 \\ +1 \\ \hline 4 \end{array}$
$\begin{array}{r} 8 \\ +0 \\ \hline 8 \end{array}$	$\begin{array}{r} 5 \\ +1 \\ \hline 6 \end{array}$	$\begin{array}{r} 3 \\ +2 \\ \hline 5 \end{array}$	$\begin{array}{r} 2 \\ +4 \\ \hline 6 \end{array}$	$\begin{array}{r} 1 \\ +8 \\ \hline 9 \end{array}$	$\begin{array}{r} 2 \\ +3 \\ \hline 5 \end{array}$

Introduction to the vertical form for addition

(ninety-one) 91

LESSON OUTCOME

Use the vertical form for addition

Materials

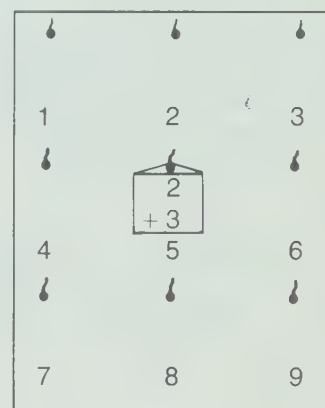
counters for each child

Vocabulary

vertical form

RELATED ACTIVITIES

- Make an addition board for sums to 9 as follows. Obtain a piece of Masonite or plywood and place nine cup hooks as shown. Leave a space under each hook and then print the numerals 1 to 9, one for each hook. Make labels (luggage labels are ideal) with an addition exercise in vertical form on each. Have the children hang a label on a hook so that the correct sum appears below the label.



LESSON ACTIVITY

Before Using the Page

- Draw on the chalkboard four objects and two objects arranged horizontally; that is, ● ● ● ● ● ●. Ask how many objects there are in each set and how many objects there are in all. Have one child write the addition sentence below the drawings. Draw the four objects again and then draw the two objects *below* the four objects; that is, ● ● ● ● ● ●.

Ask how many objects there are in each set and how many objects there are in all. Have a child write the addition sentence below the drawings. Ask if the two addition sentences are the same. Tell the children that there is another way to show "Four plus two equals six." Write $\begin{array}{r} 4 \\ +2 \\ \hline 6 \end{array}$ beside the

vertical arrangement, and say that it means the same as the number sentence $4 + 2 = 6$. The vertical form is also read, "Four plus two equals six." Draw other sets of objects in a

vertical arrangement and have children write the vertical form of addition for each.

Using the Page

- Direct the children's attention to the illustration at the upper left on the page. Ask how many apples there are in the first set and how many apples there are in the second set. Have the children trace over the dotted ring and ask them how many apples there are altogether. Have the children trace over the dotted 3.

Discuss the illustration at the upper right in a similar way and have the children show the sum of 3 and 2. Then let the children work independently. At this stage, many children may be able to write the answers without having to use counters. Nevertheless, have counters available for those who need them.

- After the children have completed the page, have them ring an addition fact and make up a story problem that corresponds to the addition fact. For example, for the fifth exercise in the first row a child might state, "There are three red apples and five green apples in a bag. There are eight apples in the bag."

LESSON OUTCOME

Use information to make a bar graph; interpret the information shown in a graph

Materials

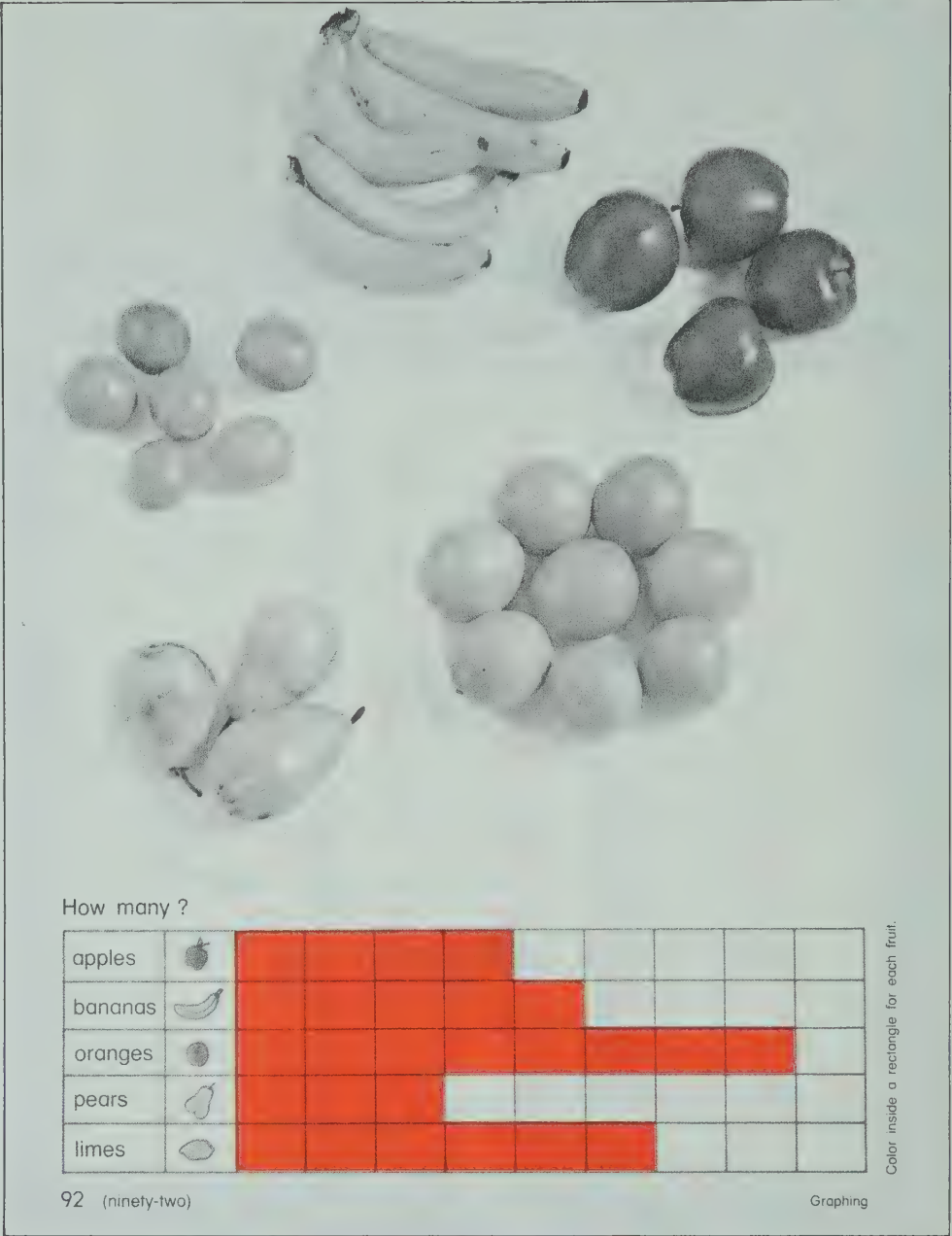
Unifix cubes, a chart for making a graph, crayons for each child

Vocabulary

graph

RELATED ACTIVITIES

- Prepare small pieces of paper measuring about 5 cm by 8 cm. On these, have the children draw pictures of their pets, one pet on each piece. (Some children may have more than one pet. Other children will have no pets and should leave their papers blank.) Make a large chart with columns labelled *Dogs*, *Cats*, *Fish*, *Rabbits*, and other headings as required. Have the children paste their drawings in the appropriate columns. Ask questions similar to the following:
“What is the most popular pet?”
“How many dogs do the children own?”
“How many dragons do the children own?”
“How many children have no pets?”



LESSON ACTIVITY

Before Using the Page

- Place nine of each color of Unifix cubes in a box. Ask each child to select a cube of her/his favorite color from the box. Have one child who chose a red cube collect all the red cubes that were chosen, join them together, and place them on a table at the front of the classroom. Have other children gather the cubes of the other colors chosen and join them in the same way. When all the color “trains” are displayed, discuss the results by asking questions similar to the following:
“Did more children choose red cubes or yellow cubes?”
“Which color is the most popular?”
“Which color is the least popular?”
“How many black cubes were chosen?”
“Is there any color that was not chosen?”

Explain to the children that these cubes will be needed for other activities and will have to be taken apart. However, you would like to make a picture that tells what happened. Have prepared in advance a large chart having a row for each

color. Ask one child to count the cubes in the yellow “train”. Color yellow that number of squares on the chart. Ask another child to count the cubes in the red “train”. Ask a child to color red that number of squares on the chart, making sure the child begins with the first square in the row. Proceed in the same way for the remaining “trains”. If there was a color of cube that no child selected, then the name of the color on the chart would have no squares colored for that row. Tell the children that this kind of picture is called a *graph*.

Colors We Like					
yellow					
red					
blue					
green					
orange					
white					

Using the Page

- Discuss with the children that the plates of fruit correspond to the “trains” of different colors that were used in the activity in *Before Using the Page*. They are to color inside a rectangle for each separate fruit.

Show 1 fewer.

Show one fewer in each set. Show how many there are.

Showing one fewer in a set

(ninety-three) 93

LESSON OUTCOME

Show one fewer member for a given set

Materials

small objects for making sets, counters for each child, overhead projector (optional)

RELATED ACTIVITIES

- Adapt the circular shape suggested in *Related Activities* on page T93 by having the children clip a clothes pin to each section to show the number that is one less than the given number.
- Read the poem on page T137 for this page. Have the children use their fingers to represent the ducks swimming away and then coming back.
- Have the children place from one to nine beads on a string or on one wire of a bead frame, or have them use their elevator beads. Ask them to take away one bead and then to draw a picture of what they did and record the number of each set. One example is shown below.



- After the children have completed the page, have them solve problems similar to the following:
 1. Look at the first pot in the second row. If you take out one more pasta piece, how many pieces will be left?
 2. Look at the second pot in the third row. If you take out one more pasta piece, how many pieces will be left?

LESSON ACTIVITY

Before Using the Page

- The following activities and the ones suggested for pages 94 and 95 are to introduce the children to basic subtraction concepts. You may wish to begin by reviewing the idea of *one more*. (See page T93.)
- Call six children to the front of the classroom. Ask five of them to curl up on the floor and pretend to be asleep. Ask the sixth child to pretend to be a bird and swoop down to take away one "seed" as you recite this poem.

Five little seeds a-sleeping they lay,
A-sleeping they lay.
A bird flew down and took one away –
How many seeds were left that day?

When the first "seed" has been taken away, ask the other children, "Are there fewer 'seeds' now? How many fewer?" Repeat the procedure as you recite, "Four little seeds a-sleeping . . ." Continue until zero "seeds" are left.

- Choose nine children to stand in a row. Ask each child in turn to sit on the floor. As each child sits, have a child outside the group state the number of children left standing. When the last child sits, a child will say, "Zero". Then ask the children to stand up in turn and to say what number they represent, beginning with *one*.

- Display a set of objects on the overhead projector, in a picture, or in your hand. Have the children use their counters to make a set with one fewer and then state the result; for example, "One fewer than seven objects is six."

Using the Page

- Read the instruction at the top of the page with the children. Ask how many pasta pieces there are in the first pot and how many of these pieces are marked with an X. Have the children trace over the dotted X. Explain that the X is used to show that we want to take away one piece. Ask how many pieces are left in the pot if one piece is taken away. Have the children trace over the dotted 2. Then let the children continue on their own, marking an X on one pasta piece in each pot, and printing the numeral to show the number of pasta pieces left in the pot.

LESSON OUTCOME

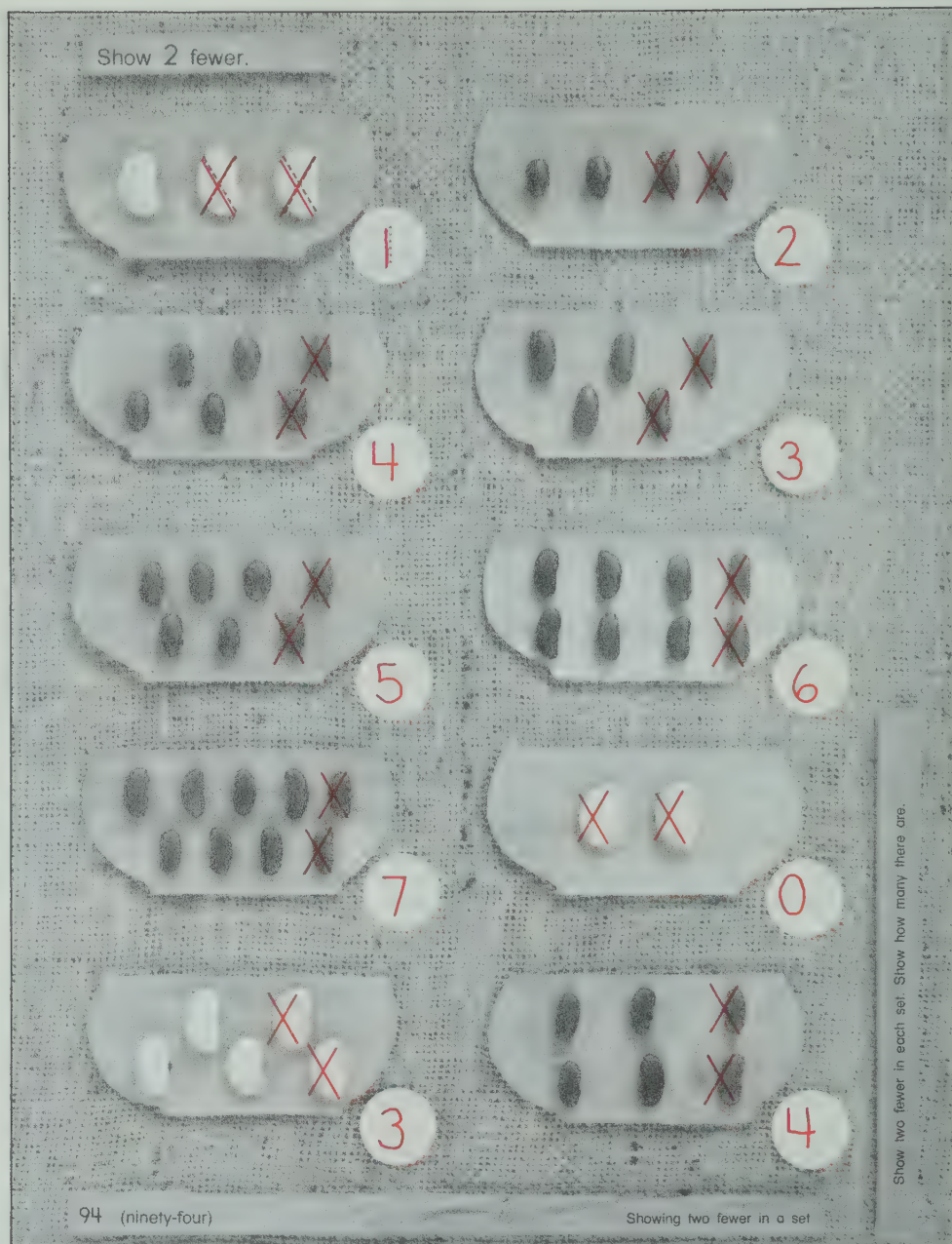
Show two fewer members for a given set

Materials

small objects or pictures, counters for each child, display board and cutouts

RELATED ACTIVITIES

- Adapt the bead-threading activity suggested on page T123 by having the children take away two beads and draw a picture of what they did.
- Make a work sheet with instructions such as the following:
 - Draw 6 red \bigcirc 's. Use X's to show 2 \bigcirc 's fewer.
 - Draw 3 blue \square 's. Use an X to show 1 \square fewer.
 - Draw 5 green \triangle 's. Use X's to show 2 \triangle 's fewer.
- Adapt the circular shape suggested in *Related Activities* on page T93 by having the children clip a clothes pin to each section to show the number that is one less than the given number.
- After the children have completed the page, have them solve problems similar to the following:
 - Look at the first bowl in the third row. If you take out two more beans, how many beans will be left?
 - Look at the second bowl in the first row. If you take out two more beans, how many beans will be left?



LESSON ACTIVITY

Before Using the Page

- You may wish to begin by reviewing the idea of *two more*. (See page T94.)
- Print the numerals from 1 to 9 in a row on the chalkboard. Enclose them in shapes to represent sausages as shown.



Quote the following:

Nine fat sausages frying in a pan;
One went, "POP!" and another went, "BANG!"

When you say "POP!" mark an X through 9 and another through 8 when you say "BANG!" Ask the children to state how many sausages there are now. Have one child mark the X as you continue:

Seven fat sausages frying in a pan;
One went, "POP!" and another went, "BANG!"

Have other children mark the X's as you continue the rhyme. Ask how many sausages are left each time. If you wish, have the children say the words or clap hands when the words "POP" and "BANG" are mentioned.

- Using small objects or pictures, display a set having not more than nine members. Have the children use their counters to make a set having two fewer members. Repeat several times.

Using the Page

- Read the instruction at the top of the page with the children. Ask how many beans there are in the first bowl and how many of these beans are marked with an X. Have the children trace over the two dotted X's. Ask how many beans are left in the bowl if two beans are taken away. Have the children trace over the dotted 1. Then let the children continue on their own, marking X's on two of the beans in each bowl, and printing the numeral to show the number of beans left in the bowl.

LESSON OUTCOME

Show three fewer members for a given set

Materials

small objects for making sets, counters for each child

RELATED ACTIVITIES

- Adapt the activities suggested on pages T123 and T124.
- Have the children cut pictures from catalogues and paste them on sheets of paper to make sets having from four to nine members. They may exchange these, record the number of each set, cross out three members of the set, and record the number of the new set.
- After the children have completed the page, have them solve problems similar to the following:
 1. Look at the first bowl in the second row. If you take out three more beans, how many beans will be left?
 2. Look at the first bowl in the fourth row. If you take out three more beans, how many beans will be left?
 3. Count the bowls on the page from which you cannot take out three more beans.
- Play "I Am Thinking of a Number". Draw a number line on the chalkboard. Say, "I am thinking of a number that is three less than five. What is the number?" The children locate the number that is "three steps before five". Repeat for other numbers.

Show 3 fewer.

Show three fewer in each set. Show how many there are.

Showing three fewer in a set

(ninety-five) 95

LESSON ACTIVITY

Before Using the Page

- You may wish to begin by reviewing the idea of *three more*. (See page T95.)

- Ask nine children to sit in a group on the floor. Quote the following rhyme of four verses. When you say "took away three", three acorns (children) are to leave the group. Ask how many "acorns" are left.

Nine fat acorns hanging from a tree.
Along came a squirrel and took away three.
How many acorns were left for me?

Continue the procedure for the next two verses required.

Six fat acorns, and so on.
Three fat acorns, and so on.

End with the following verse:

Not a single acorn hanging from the tree.
Along came a squirrel looking everywhere
But he couldn't see an acorn ANYWHERE THERE.

- Display nine objects. Print 9 on the chalkboard. Ask one child to take away three objects and to record the number left. Ask another child to take away three objects and to record the number left. Ask another child to take away three and to record the number left (zero). Ask one child to read the numbers shown on the chalkboard (nine, six, three, zero).

- Display a set having from three to nine objects. Have the children use their counters to make a set having three fewer objects. Ask how many there are in the set they have made. Repeat several times.

Using the Page

- Read the instruction at the top of the page with the children. Ask how many beans there are in the first bowl and how many of these beans are marked with an X. Have the children trace over the three dotted X's. Ask how many beans are left in the bowl if three beans are taken away. Have the children trace over the dotted 1. Then let the children continue on their own, marking X's on three of the beans in each bowl, and printing the numeral to show the number of beans left in the bowl.

LESSON OUTCOME

Recognize the action of separating a set into two groups and associate numbers with the groups

Materials

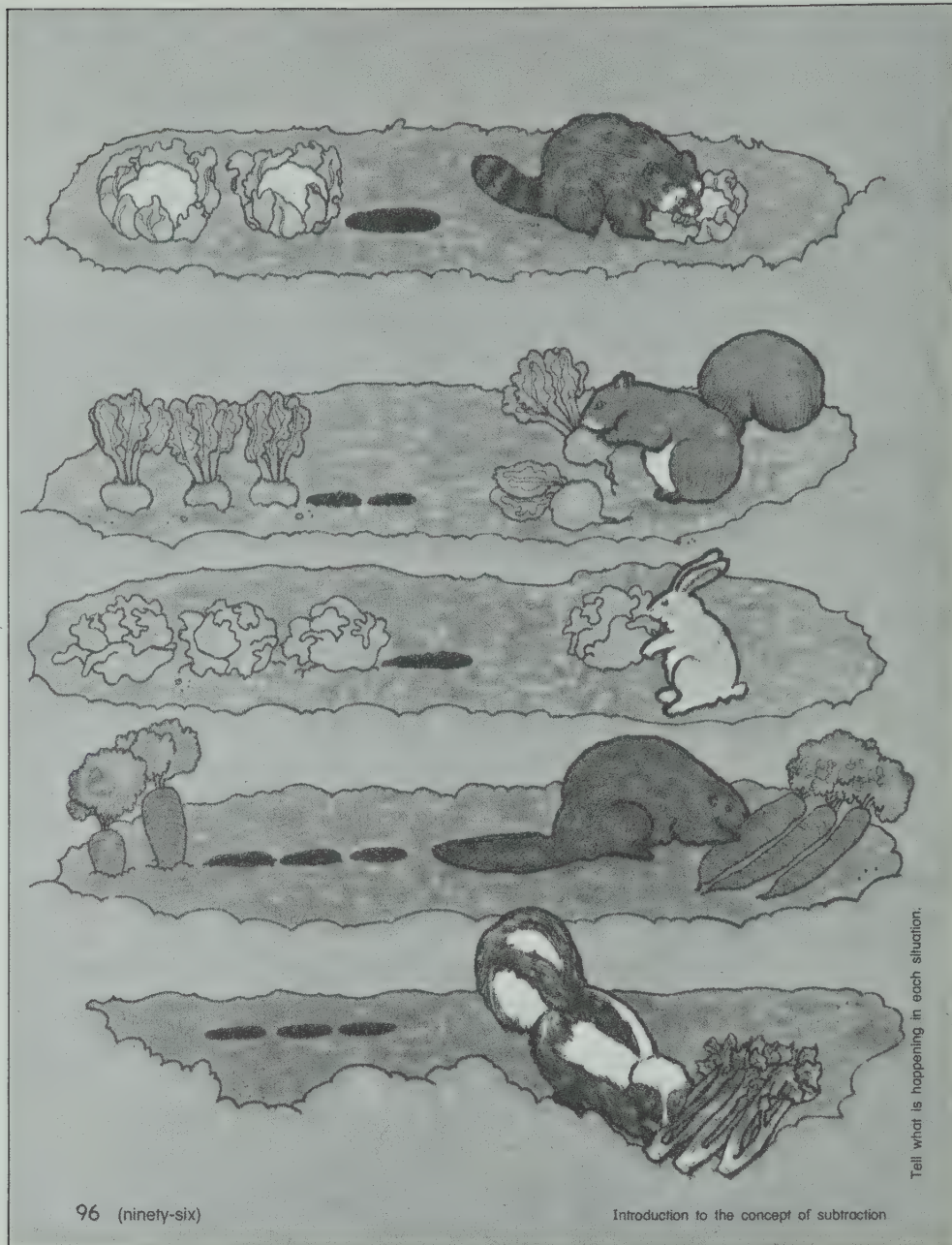
balls and small objects for making sets, display board and cutouts

Background

Subtraction is introduced through the idea of "take away" because it occurs in the children's experiences. The other form of subtraction, the idea of comparison, will be introduced in Unit 7. Be careful when using the words *take away* and *subtract*. *Take away* is used conventionally for sets and *subtract* is used for numbers.

RELATED ACTIVITIES

- Have the children make up stories for other children to solve. They may draw pictures to illustrate their stories. You may prefer to collect pictures from magazines and have the children use these for making up their stories.



Tell what is happening in each situation.

96 (ninety-six)

Introduction to the concept of subtraction

LESSON ACTIVITY

Before Using the Page

- Display a set of five balls. Ask the children how many balls there are. Separate two balls from the others and then remove them. Ask how many balls are left. Have the children describe what happened by saying, "There were five balls. Two balls were taken away. Now there are three balls." Repeat with other sets of not more than nine objects. After each separation and its description, you may wish to show how rejoining the two sets gives the original number. This will help children see the inverse relationship that exists between addition and subtraction.
- Ask one child to place a set of objects (not more than nine) on the display board. Ask a second child to state how many objects there are. Ask a third child to take away some of the objects and to state how many have been taken away. Ask a fourth child to describe what happened in three statements similar to those suggested in the first activity. Repeat several times.

- Draw a set of four cookies on the chalkboard. Ask one child to pretend to eat two of them (erase them from the chalkboard) and state how many cookies are left. Ask another child to describe what happened by saying, "There were four cookies. Marie ate two cookies. Now there are two cookies." Repeat with other examples.

Using the Page

- Discuss the pictures of the sets with the children and have them describe what is happening in each situation.
1. "There were three heads of cauliflower. The raccoon took away one head of cauliflower. Now there are two heads of cauliflower left."
 2. "There were five beets. The squirrel took away two beets. Now there are three beets left."
 3. "There were four heads of lettuce. The rabbit took away one head. Now there are three heads of lettuce left."
 4. "There were five carrots. The beaver took away three carrots. Now there are two carrots left."
 5. "There were three bunches of celery. The skunk took away the three bunches. Now there are zero bunches left."

Complete.



$$\underline{5} \quad \text{minus} \quad \underline{2}$$



$$\underline{8} \quad \text{minus} \quad \underline{2}$$



$$\underline{7} \quad \text{minus} \quad \underline{4}$$



$$\underline{9} \quad \text{minus} \quad \underline{5}$$



$$\underline{6} \quad \text{minus} \quad \underline{3}$$

Introduction to the word *minus* and the sign —

(ninety-seven) 97

LESSON OUTCOME

Recognize the word *minus* and the sign — and know that they relate to subtraction

Materials

small objects for making sets, counters for each child, display board and cutouts, flash card showing the word *minus*

Vocabulary

minus (—), subtract, subtraction

RELATED ACTIVITIES

- Using nine nuts and a picture of a tree, have the children pretend to be squirrels. Place some of the nuts on the tree. Ask a child to pretend to be a squirrel and to take nuts from the tree. Ask another child to state how many nuts there were on the tree, how many nuts were taken, and how many nuts are left.
- Give each of several children some straws (from one to nine). Give each of several other children a card showing a numeral from 0 to 9. Have the children with the cards take straws from the other children. For example, when you call out "four from six", the child with the card for 4 goes to the child holding six straws and takes four of them. The child then states, "There were six. I took away four. Now there are two." If the child makes the correct statements, let that child become the leader for the next turn.

LESSON ACTIVITY

Before Using the Page

- Give one child four objects. Ask another child to take two of the objects. Have the first child describe what happened: "I had four _____. Jason took away two _____. Now I have two _____." Repeat several times using different numbers of objects.
- Give each child nine counters. Have the children place five counters on their desks. Ask them to take away two of the counters. Ask how many are left. Have one child describe what happened. Repeat several times using different numbers of counters.
- Place four cutouts on the display board. Ask one child to state how many there are. Have another child take away one cutout and say, "There were four. I took away one. Now there are three." Repeat several times and have children make the three statements to describe each situation. Emphasize that the number of the original set is always stated first.

- Draw four objects on the chalkboard. Ask a child to mark an X on one object to show that it is being removed. Print a 4 below the set and a 1 below the object that is crossed out. Place the symbol — between the 4 and the 1 and read the phrase as "four *minus* one". Display a flash card with the word *minus* on it. Have the children say the word. Explain that 4 — 1 is a short way of showing that one object is removed from a set of four objects. Tell the children that "four minus one" means that we are to *subtract* the two numbers.

Using the Page

- Discuss the first exercise with the children. Ask how many potatoes there are and how many of them are crossed out. Have the children trace over the 5 and the 2. Have children say, "Five minus two".
- Discuss the number of ears of corn and how many of them are crossed out. Then let the children proceed on their own. Note that they are to draw minus signs in the last two exercises.
- After the children have completed the page, ask them to read the phrases as "eight minus two" and so on.

LESSON OUTCOME

Complete number sentences to show subtraction

Materials

display board and cutouts, numeral cards and symbol cards, flash cards showing the words *minus* and *equals*, counters for each child

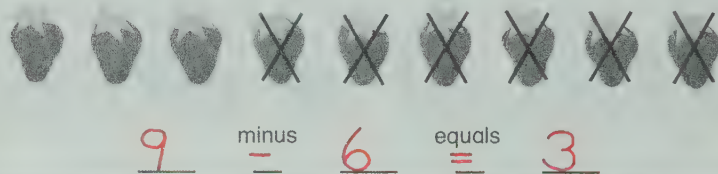
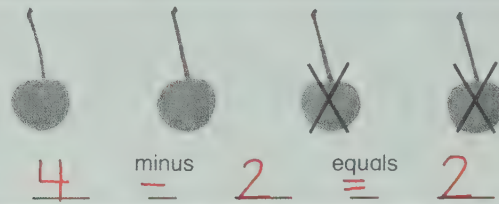
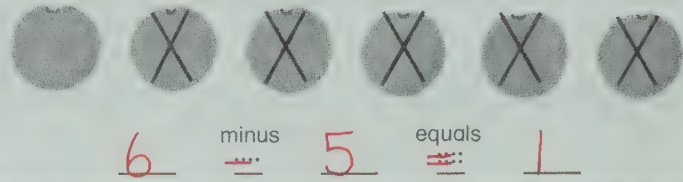
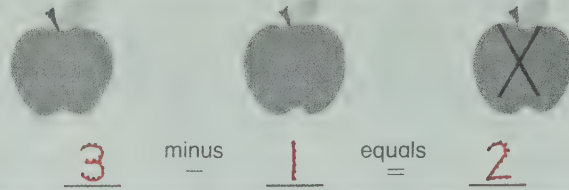
Vocabulary

subtraction sentence

RELATED ACTIVITIES

- Have the children illustrate subtraction situations and write the corresponding subtraction sentences by rolling special dice as suggested on page T137.
- For each exercise on page 97, have the children form a subtraction sentence by writing = and the difference. Then ask several children in turn to read a sentence and to describe the action suggested in the illustration.

Complete.



98 (ninety-eight)

Introduction to the number sentence to show subtraction

LESSON ACTIVITY

Before Using the Page

- Review the use of the symbol $-$ to indicate that numbers are to be subtracted. Display a flash card with the word *minus* on it. Ask the children if they recognize the word. Remember to avoid saying "subtract the sets" and also try to avoid using the symbol $-$ between pictures of sets. When the symbol $-$ appears, encourage the children to say "minus" instead of "take away" because in a later unit the subtraction exercises do not involve "take away".
- Place three cutouts on the display board. Ask how many there are. Push away two of the cutouts. Ask how many cutouts are left. Have children place the symbols 3, $-$, and 2 below the sets. Have a child read the phrase as "three minus two". Place the symbol $=$ to the right of $3 - 2$. Hold up a flash card with the word *equals* on one side and the symbol $=$ on the other. Ask the children if they remember the word. If not, turn the card over and ask them if they can tell you what the symbol means. Ask what number the phrase $3 - 2$ names.

Place a 1 to the right of the symbol $=$. Ask a child to read the number sentence $3 - 2 = 1$ by saying, "Three minus two equals one." Tell the child that we call " $3 - 2 = 1$ " a subtraction sentence because it tells that we are to subtract the number 2 from the number 3. Emphasize that $3 - 2$ and 1 are names for the same number.

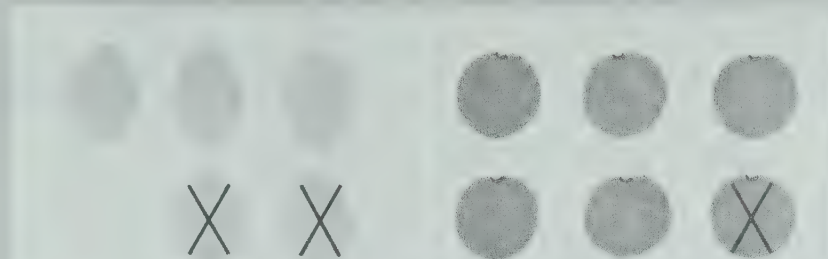
- Have the children use counters to make sets. Ask them to remove a given number from each set and then to state the corresponding subtraction sentence.

Using the Page

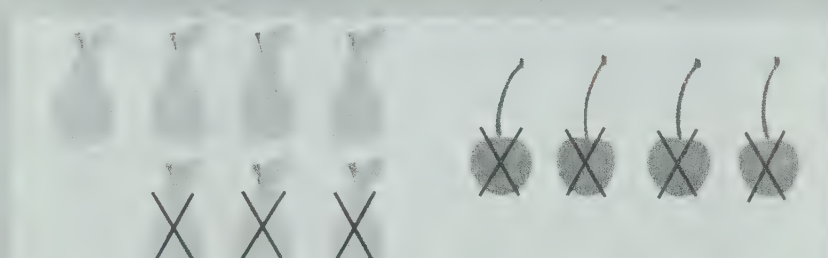
- Discuss the first exercise with the children. Ask how many apples there are, how many apples are crossed out, and how many apples are left. Have the children trace over the dotted 3, 1, and 2. Ask a child to read the subtraction sentence.

For the second exercise, ask how many oranges there are and how many of them are crossed out. Have the children print the numerals and trace over the dotted $-$ and the dotted $=$. Let the children continue on their own, printing the numerals and the symbols.

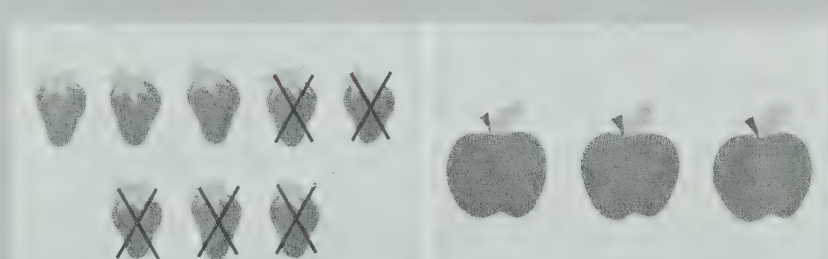
Complete.



$5 - 2 = 3$ $6 - 1 = 5$



$7 - 3 = 4$ $4 - 4 = 0$



$8 - 5 = 3$ $3 - 0 = 3$

Writing subtraction sentences

(ninety-nine) 99

LESSON OUTCOME

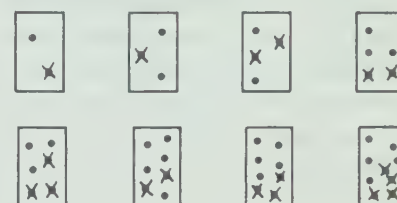
Write number sentences to show subtraction

Materials

display board and cutouts, nine counters for each child

RELATED ACTIVITIES

- Use index cards to make a set of cards so that each child in the class may have one card. On each card make a dot picture with not more than nine gummed dots arranged randomly. Mark X's through some of the dots to illustrate as many different subtractive situations as possible.



Distribute the cards. Ask each child to write the subtraction sentence corresponding to the card. You may wish to have the children copy the sets from the cards first. Have the children exchange cards and write as many subtraction sentences as they can in the time available.

LESSON ACTIVITY

Before Using the Page

- Place four cutouts on the display board. Ask one child to move some away. Ask another child to describe what happened and to write the subtraction sentence on the chalkboard. Repeat several times.
- Have children make up stories. For example, "Last Saturday in the park I saw five squirrels on the ground. When I came closer to them, two ran up a tree. How many squirrels were left on the ground?" Have children use counters to illustrate the subtractive situation and then ask one child to write the subtraction sentence ($5 - 2 = 3$) on the chalkboard. Repeat the procedure until many children have had an opportunity to make up an imaginary story. Some of the stories should include situations that would illustrate phrases such as $5 - 5$ and $3 - 0$.
- On the chalkboard, draw a string with three beads on it. Mark an X on the last bead and say, "I removed one of the three beads. How many beads are there now?" Ask a child to

state the subtraction sentence ($3 - 1 = 2$). Draw six beads on another string and have a child mark X's to show that two beads are removed. Ask another child to state the corresponding subtraction sentence ($6 - 2 = 4$). Repeat several times.

Using the Page

- Discuss the first exercise with the children. Ask how many lemons there are in the set and how many of them are crossed out. Ask a child to describe the situation by saying, "Five minus two equals three." Have the children trace over the numerals and symbols to show the subtraction sentence. Then let the children proceed on their own. Some children may need help with the subtraction sentences for the set of cherries and the set of apples.
- After the children have completed the page, ask them to take turns reading the subtraction sentences. Ask them to study the subtraction sentences to identify the three names for three on the page ($5 - 2$, $8 - 5$, and $3 - 0$).

LESSON OUTCOME

Complete subtraction sentences for minuends to 4

Materials

objects for making sets, display board and cutouts, counters for each child

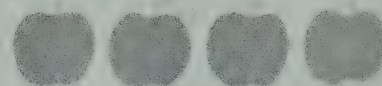
RELATED ACTIVITIES

- Play the game "Hidden Straws" with the children. Each child will need four counters. Hold up from one to four straws so that each child can see how many there are. Place the straws behind your back and separate them into two groups at random. Bring one of the two groups forward and show it to the children. The player who first identifies the number of straws in the hidden group becomes the leader. This game may be adapted for children to play in groups of five or six with a group leader.

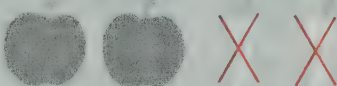
Complete the number sentences.



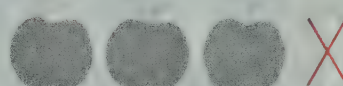
$$4 - 3 = \underline{1}$$



$$4 - 0 = \underline{4}$$



$$4 - 2 = \underline{2}$$



$$4 - 1 = \underline{3}$$

$$2 - 1 = \underline{1}$$

$$4 - 1 = \underline{3}$$

$$3 - 0 = \underline{3}$$

$$1 - 0 = \underline{1}$$

$$3 - 3 = \underline{0}$$

$$4 - 4 = \underline{0}$$

$$3 - 2 = \underline{1}$$

$$2 - 0 = \underline{2}$$

$$3 - 1 = \underline{2}$$

$$4 - 2 = \underline{2}$$

$$1 - 1 = \underline{0}$$

$$4 - 0 = \underline{4}$$

100 (one hundred)

Subtracting, minuends to 4

LESSON ACTIVITY

Before Using the Page

- Display four blocks. Ask a child to push away two of them. On the chalkboard, draw a picture of what happened. Ask one child to write the subtraction sentence ($4 - 2 = 2$) below the drawing. Have another child read the sentence as "Four minus two equals two." Repeat with other sets.
- Place four cutouts inside a set holder on the display board. Ask how many cutouts there are in the set. Ask the children to close their eyes while you take away some cutouts. Take away the four cutouts. Have the children open their eyes and ask a child to describe what happened while one child states the subtraction sentence ($4 - 4 = 0$) and another child writes it on the chalkboard.

Repeat the procedure but do not take away any cutouts. Ask questions as before to obtain the subtraction sentence $4 - 0 = 4$. Repeat several times for other sets of one, two, and three for which either zero cutouts or all the cutouts are removed from each set.

- Draw a set of four apples on the chalkboard. Mark X's through three of the apples. Write $4 - 3 = \underline{\quad}$ below the set. Ask what numbers are needed to complete the subtraction sentence. Repeat for other sets of apples and have the children complete sentences in the following forms:

$$4 - \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} - \underline{\quad} = \underline{\quad}$$

Using the Page

- For the first exercise, ask how many apples there were before some were eaten. Ask how many apples were eaten. Have the children mark an X on each apple core. Ask how many apples are left. Have the children trace over the dotted 1.

For the second exercise, lead the children to say that zero apples were eaten. Then let the children complete the sentences. Remind them to mark an X on each apple core.

- After the children have completed the page, challenge them to find two names for three on the page ($4 - 1$ and $3 - 0$), three names for two ($2 - 0$, $3 - 1$, and $4 - 2$), and three names for zero ($1 - 1$, $3 - 3$, $4 - 4$).

LESSON OUTCOME

Recognize a nickel and know that it is equivalent to five pennies and its value is 5 cents

Materials

real money, play money, or coin cutouts from copies of page T337, objects with tags for prices from 1¢ to 9¢

Vocabulary

nickel, same value

RELATED ACTIVITIES

- Expand the play store that was suggested on page T49 by including items priced to 9¢. Ask children what items they can buy for 4¢, 6¢, 7¢, and so on. Give each child a number of coins and have her/him state what she/he can buy. For example, with three pennies and a nickel, one could buy an item that costs 1¢, 2¢, 3¢, 5¢, 6¢, 7¢, and 8¢. In other words, making change is not involved at this time.

As the children get more competent with money, you may wish to make "bills" for them to use when they go to the play store. Have them draw or name the items they buy, record the cost of each item, find the amount spent, and then choose the correct coins to pay the "bill".

Mark.

nickel
5 cents 5¢

3¢

4¢

5¢

6¢

8¢

9¢

Use a / to show each coin needed.

Introduction to the nickel; amounts to 9 cents

(one hundred one) 101

LESSON ACTIVITY

Before Using the Page

- The penny was introduced on page 37. The nickel is introduced now so that money can be seen as an application for sums to 9 cents. Many children will have had experiences with the nickel, but the idea that one nickel has the same value as five pennies will probably be new to them.

Review the penny and its value. Using real pennies, display two pennies and establish that their value is 2 cents. Continue showing one more penny each time until there are five pennies in a row. Display a nickel and compare it with a penny with respect to color, shape, and size. Introduce the word *nickel*. Place the nickel below the row of five pennies. Discuss the idea that five pennies have the *same value* as one nickel.

- Display nine pennies in one group and one nickel and four pennies in another group. Have the children count by ones to nine for the first group. For the second group, have them start at five for the nickel and then count by ones for the pennies.

- Display sets of pennies and nickels with values to 9 cents. Have children tell the value of each set of coins.

- Give each child a set of coins consisting of five pennies and one nickel. Have the children group coins worth 3¢, 4¢, 5¢, 6¢, 7¢, 8¢, and 9¢. Repeat for random values to 9¢.

- Hold up a small item showing a price from 1¢ to 4¢. Have a child choose the coins necessary to "pay for" the item. Repeat for other items. For an item priced at 5¢, ask for two ways to "pay for" the item. Emphasize that it is easier to carry one nickel than five pennies. Repeat for items priced to 9¢.

Using the Page

- Direct the children's attention to the coins at the top of the page. Emphasize that a nickel has the same value as five pennies. Ask a child to tell the cost of the grapes. Ask another child to tell how many pennies must be marked with a check to "buy" the grapes. Have the children check the first three pennies. Then have the children mark the coins required in each of the other sets.

LESSON OUTCOME

Identify three-dimensional shapes and recognize drawings of them

Materials

containers that suggest the seven shapes shown, a set of three-dimensional models in wood or plastic, crayons for each child

Vocabulary

cone, cube, cylinder, prism, pyramid, sphere, surface

RELATED ACTIVITIES

- Have the children find pictures in magazines and catalogues that suggest the three-dimensional shapes. If the pictures are pasted on cards, the children can sort them according to shape or other properties; for example, those that can be stacked, those that can roll, those that have only flat surfaces.
- Have the children make models from Plasticine that suggest the basic shape of the cylinder, the cone, and the sphere.
- You may wish to review some of the activities suggested for three-dimensional shapes on page T6.
- Have the children draw around the faces of several of the wooden or plastic models. Ask them to draw funny faces inside the outline of each face (triangle, circle, square, rectangle) to remind them that each flat surface of a three-dimensional shape is called a *face*.

Color.

black blue green white red brown yellow white blue white

How many did you color ?

's 1 's 2 's 2

's 3 's 2 's 1 's 2

102 (one hundred two)

Identifying three-dimensional shapes

LESSON ACTIVITY

Before Using the Page

- Before teaching this lesson assemble as many containers as possible of different sizes; that is, small cubes and large cubes, cones of different sizes, and spheres in various sizes. Children will enjoy bringing containers from home for the collection. You may not wish to use all the mathematical names for the shapes at this time; for example, you may prefer to speak of spheres as balls, and cylinders as cans.

Place at least two of each different shape on a table. Choose two of these, for example, a cube and a cone. Ask the children how these shapes are different and how they are alike. (The cube has edges, corners, and six square faces. The cone has one circular face and a curved surface. The cube can not roll, but the cone can.) Choose two other shapes and again discuss how they are alike and how they are different.

- Choose one shape from the three-dimensional models. Have a child find a container or other object having a shape corre-

sponding to that of the given shape. Repeat several times for other shapes.

Using the Page

- Discuss the seven shapes by asking the children questions similar to the following:

“Which shape is red (white, blue, black)?”

“What color will you use for a sphere (cone, cylinder)?”

Have the children color the shapes the appropriate color. Then have them count how many there are of each shape and record the number.

- After the children have completed the page, you may wish to ask these questions:

“How many of the shapes are red (blue, green, yellow, black)?”

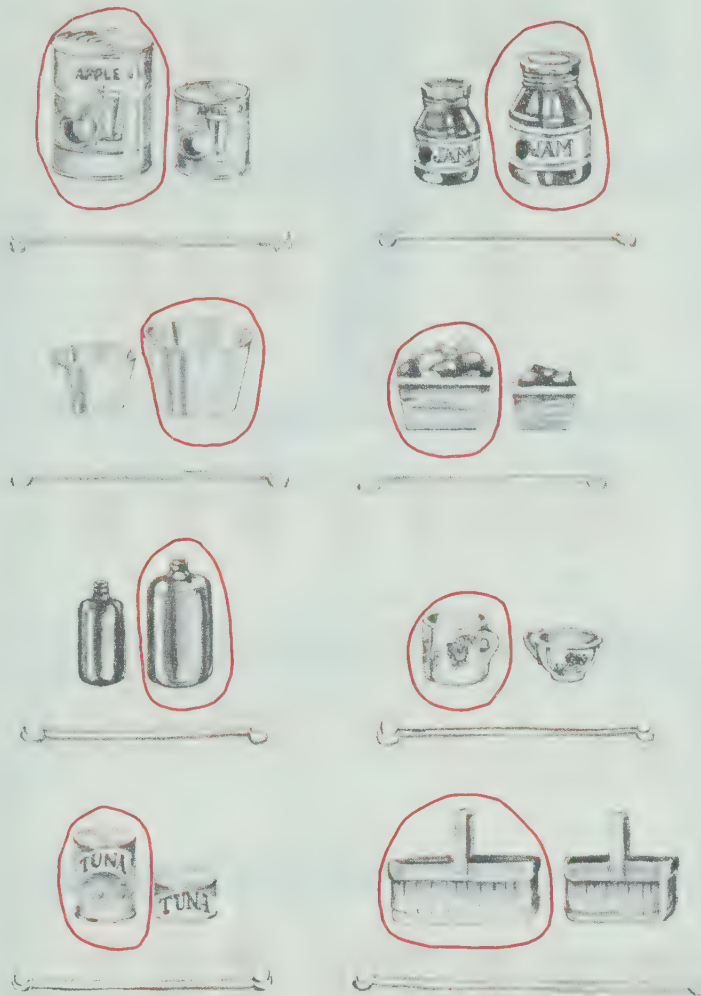
“How many of the shapes you colored can roll?”

“How many of the shapes you colored can not roll?”

“How many of the shapes have no flat surfaces?”

“How many of the shapes have triangular faces?”

Ring the one that holds more.



Comparing the capacities of containers

(one hundred three) 103

LESSON OUTCOME

Identify which of two containers holds more than the other

Materials

containers of various sizes; materials for pouring such as peas, beans, rice, shells, sand, water; spoons or scoops, funnels (optional)

Vocabulary

holds more than, holds less than, holds about the same

RELATED ACTIVITIES

- Have the children fill two containers of different sizes using a small container and count how many times it was used to fill each. Make sure that the number of times will not be more than nine. Have the children state which container holds more. As the children become familiar with the small container, have them estimate first how many times it will be used to fill a large container.
- Have the children cut pictures from catalogues and magazines of different kinds of containers. Have them paste the pictures on sheets of paper to make a booklet entitled "Containers".

LESSON ACTIVITY

Before Using the Page

- Have available a variety of cans, bottles, boxes, and other containers. Discuss the different kinds of foods that are bought in cans, bottles, boxes, and baskets. For example, juices and milk can be bought in cartons, bags, cans, or bottles; fresh fruits can be bought in bags, boxes, or baskets. Point out that many foods come in packages of several different sizes.
- Have children use small containers filled with rice or sand to fill other containers. Discuss what they have discovered from their activities. Ask questions emphasizing the phrases *holds more than*, *holds less than*, and *holds about the same*. Vary the wording in the questions; for example, "Does this can hold more sand than this mug?" "Which of these two boxes holds more beans?" "Will this can hold all the sand in this box?"
- Try to find a short, wide container and a tall, narrow container that hold about the same amount. Ask the children which

container they think will hold more sand (peas, beans). Have them fill one container and pour the contents into the other container. What do they observe?

- Choose two containers of different sizes. Have children find out which container holds more by filling one with sand (rice, beans) and then pouring the contents into the second container.
- Have children fill a large juice can with water and then pour it into a container with a wide bottom. Are they surprised at the change in the depth of the water? Lead them to understand that things that can be poured take the shape of the container. Ask them if they can think of something that we do not usually pour, but it takes the shape of the container, for example, ice cream.

Using the Page

- From the preliminary activities, the children will realize that the larger the container is the more it will hold. Read the instruction at the top of the page with the children. Then have the children ring the appropriate container in each pair.

LESSON OUTCOME

Illustrate subtraction sentences

Materials

display boards and cutouts, counters for each child

RELATED ACTIVITIES

- Ask some children to make up stories about subtractive situations. For example, "I saw five ducks on a pond. Two of them swam away to try to catch a dragonfly. How many ducks were left?" Ask other children to draw the illustrations and to write the corresponding subtraction sentences.
- Have the children use counters to help them write all the subtraction sentences starting with a given number, for example, three or four. For four, they will start with four counters and take away one counter. The subtraction sentence will be $4 - 1 = 3$. When they take away two counters, the subtraction sentence will be $4 - 2 = 2$. If they do not think of them, remind the children to include $4 - 0 = 4$ and $4 - 4 = 0$.

Draw.

3 - 2 = 1

4 - 1 = 3

2 - 1 = 1

3 - 3 = 0

7 - 5 = 2

9 - 3 = 6

8 - 4 = 4

104 (one hundred four)

illustrating subtraction sentences

Draw the shapes needed to illustrate each number sentence.

LESSON ACTIVITY

Before Using the Page

- Ask a child to place five cutouts on the display board. Ask another child to place a card to hide two of the cutouts and state how many are left. Have a third child state the subtraction sentence: "Five minus two equals three." Write the subtraction sentence $5 - 2 = 3$ on the chalkboard. Repeat this procedure with other subtraction sentences. Be sure to include examples to illustrate $4 - 0 = 4$ and $4 - 4 = 0$.
- Write the subtraction sentence $5 - 4 = 1$ on the chalkboard. Have children use cutouts at the display board to illustrate it. Have the other children use their counters to illustrate it. Repeat for other subtraction sentences.
- Write the sentence $6 - 3 = \underline{\quad}$ on the chalkboard. Ask the children to illustrate the sentence, not with cutouts or counters, but by drawing a diagram on the chalkboard. Lead them to suggest drawing six objects and marking X's on three of them to indicate that they are removed. Have children help

to do this and to complete the subtraction sentence on the chalkboard. Repeat for other subtraction sentences.

Using the Page

- Discuss the first exercise with the children. Ask how many strawberries there are in the set. Ask how many strawberries are crossed out and how many strawberries are left. Have the children trace over the dotted X's. Ask a child to read the subtraction sentence.

Have the children draw the strawberries required for each of the six subtraction sentences, then cross out the strawberries indicated by the second number in the subtraction sentence, and record the number of strawberries left. Some children may prefer to use counters to illustrate each subtraction sentence before they start to draw the set.

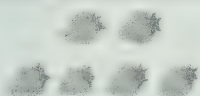
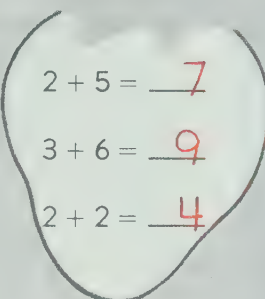
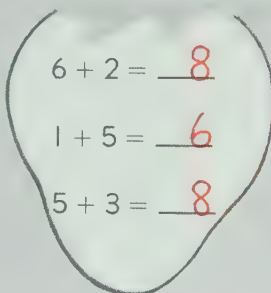
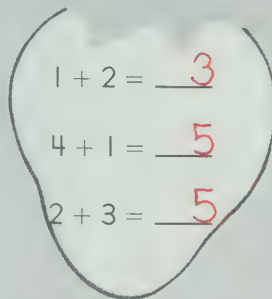
Complete.



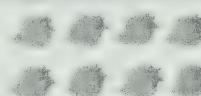
$$3 + 2 = \underline{5}$$



$$4 + 3 = \underline{7}$$



$$\begin{array}{r} 2 \\ + 4 \\ \hline 6 \end{array}$$



$$\begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 7 \\ + 1 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 6 \\ + 3 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 3 \\ + 4 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 5 \\ + 0 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 5 \\ + 4 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 1 \\ + 3 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 3 \\ + 1 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 5 \\ + 2 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 4 \\ + 5 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 3 \\ + 5 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 2 \\ + 7 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 6 \\ + 1 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 0 \\ + 7 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 4 \\ + 2 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 2 \\ + 6 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 5 \\ + 1 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 7 \\ + 2 \\ \hline 9 \end{array}$$

Reviewing addition, sums to 9

(one hundred five) 105

LESSON OUTCOME

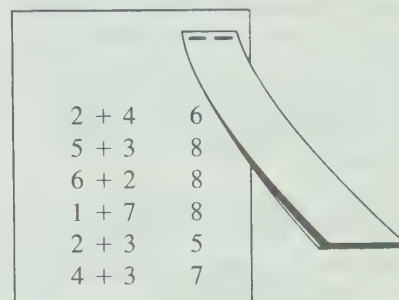
Complete basic addition facts for sums to 9

Materials

overhead projector and colored transparent bingo chips, nine counters for each child

RELATED ACTIVITIES

- Make cards with addition phrases listed at the left and the answers at the right. Staple strips of paper over the answers. Have the children write the sums on the top strip and then pull it off, look underneath the remaining strips, and check their answers.



- Have the children play the game "Lucky Nine" described on page T137.

LESSON ACTIVITY

Before Using the Page

- The preceding lessons in this unit have dealt with introducing the concept of subtraction. This lesson provides an opportunity to review addition concepts prior to the *Checkup*.
- Use counters, for example, colored transparent bingo chips, and the overhead projector. Show three counters as you say, "Our class ate three pizzas." Place two more counters on the overhead projector as you say, "Then we ate two more pizzas." Ask the children, "How many pizzas did we eat in all?" After the answer is given, ask the children whether this is an example of addition or subtraction and have them explain their answer. Review the facts in the story problem as you write the sentence $3 + 2 = 5$ on the chalkboard. Emphasize that the action suggests addition.
- Have the children use from one to nine counters. Ask them to tell addition story problems and, if necessary, use the counters to solve them. For each story, have children write the addition sentence on the chalkboard and read the sentence.

Using the Page

- Discuss and complete the first exercise with the children. Then let them work independently. Encourage them to use counters only if necessary, preferably only to check their answers.

OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

Materials

number concept cards for each child, overhead projector (optional)

RELATED ACTIVITIES

- Ask an even number of children to sit in a circle. If there are 18 children, give each child a card showing a numeral from 1 to 9. Two children will have cards showing 8, for example. The child who is IT stands in the middle of the circle and states an addition phrase such as "two plus one". The two children having the cards showing 3 try to change places before IT can sit in one of their places. The child who becomes IT states a new addition phrase and the game continues.

- You may wish to prepare work sheets for the children to become involved in the activity "Eating Nuts" described on page T137.

Complete.

$$2 + 3 = 5$$

$$1 + 0 = 1$$

$$2 + 2 = 4$$

$$4 + 2 = 6$$

$$3 + 2 = 5$$

$$4 + 3 = 7$$

$$6 + 3 = 9$$

$$5 + 4 = 9$$

$$5 + 3 = 8$$

$$3 + 4 = 7$$

$$0 + 7 = 7$$

$$4 + 4 = 8$$

$$\begin{array}{r} 1 \\ + 4 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 5 \\ + 2 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 7 \\ + 1 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 0 \\ + 6 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 2 \\ + 4 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 1 \\ + 3 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 2 \\ + 5 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 6 \\ + 2 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 2 \\ + 1 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 4 \\ + 5 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 4 \\ + 0 \\ \hline 4 \end{array}$$


$$\begin{array}{r} 3 \\ + 5 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 1 \\ + 2 \\ \hline 3 \end{array}$$


$$\begin{array}{r} 3 \\ + 6 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array}$$


Complete.



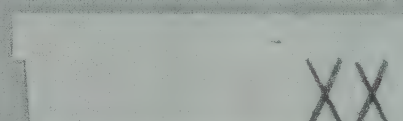
$$4 - 2 = 2$$



$$6 - 5 = 1$$



$$3 - 1 = 2$$



$$8 - 2 = 6$$


106 (one hundred six)

CHECKUP

LESSON ACTIVITY

Before Using the Page

- Show several addition exercises on the overhead projector or write them on the chalkboard. Point to each addition in turn and have the children respond by holding up the appropriate number concept card for the sum.
- Show several exercises similar to the following on the overhead projector or write them on the chalkboard.



$$5 - 3 = \underline{\quad}$$

Have children explain what the X's mean and describe what the illustration represents. Have the children respond by holding up a number concept card for the number that completes the subtraction sentence.

Using the Page

- Point out that this page is a *Checkup* and review its purpose. Discuss the exercises with the children. Ask questions to lead them to observe that the first part of the page involves addition and the second part involves subtraction. Encourage the children to use counters only if necessary, preferably only to check their answers.

Games and Activities

Poem for page 85

There was an old man who said, "Do
Tell me *how* I should add two and two?
I think more and more
That it makes about four -
But I fear that is almost too few."

Poem for page 93

Five little ducks went swimming one day,
Over the pond and far away.
Mother Duck said, "Quack, quack, quack, quack."
But only four little ducks came back.

Four little ducks went swimming one day,
Over the pond . . .

Last verse:

One little duck went swimming one day,
Over the pond and far away.
Mother Duck says, "Quack, quack, quack, quack,"
And five little ducks come swimming back.

Activity for page 98

Prepare three cubes to be used as dice. Mark or glue red dots on the first die to show 9, 9, 8, 7, 6, and 5. Mark or glue blue dots on the second die to show 5, 4, 3, 2, 1, and 0. Mark the third die to show *minus*, *-*, *minus*, *-*, *minus*, *-*. Identify it so that it can be referred to as the white die.

Ask one child to roll the dice. Ask another child to place them in the order of red, white, and blue. If the dice show 9, *-*, and 4, for example, ask another child to write $9 - 4$ on the chalkboard. Have all the children draw the sets and write the subtraction sentence $9 - 4 = 5$. Ask a child to complete the sentence on the chalkboard.

Ask another child to roll the dice and have other children repeat the procedure.



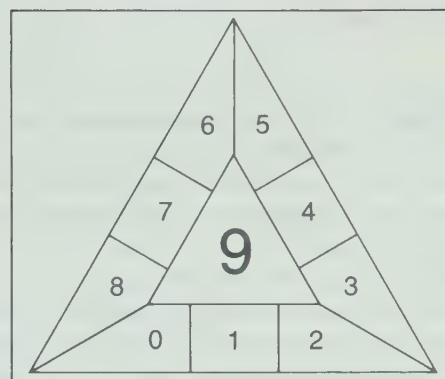
$$9 - 4$$



Lucky Nine (Game for page 105)

Materials

a game board as shown below
ten markers for each player
domino cards such that the sum of the two numbers represented on the card is less than 10



Rules

1. The domino cards are turned face down.
2. The first of two or three players turns a domino card face up and states the corresponding addition sentence, for example,

$$6 + 2 = 8 \text{ for}$$

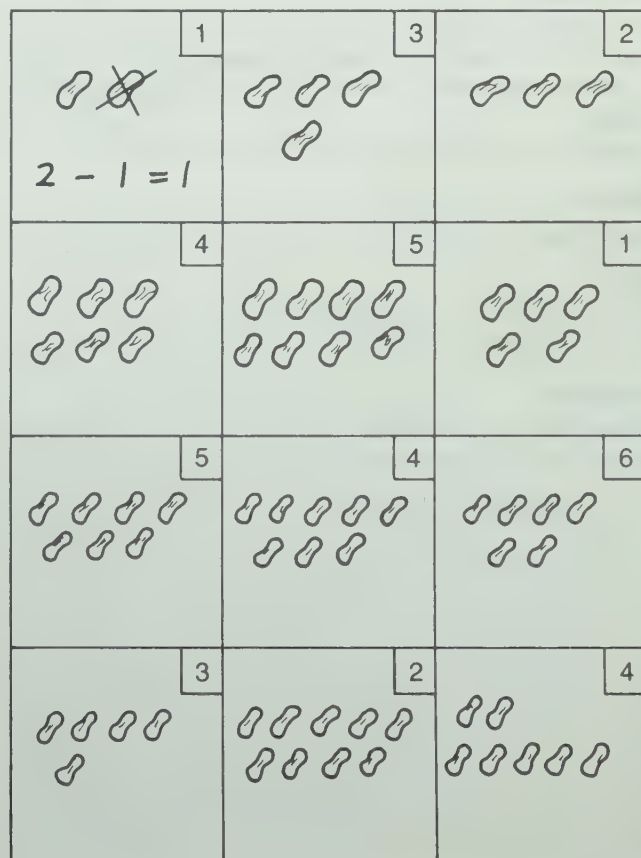


and places a marker on the space for 8 on the game board. If there is a marker on the space for 8 already, the player removes it and places it in her/his pile of markers, instead of placing a marker there.

3. A player who obtains a domino card for 9 claims all the markers on the game board.
4. The game ends when one player has no more markers.
5. The winner is the player with the most markers.

Eating Nuts (Activity for page 106)

Have the children pretend to eat nuts by marking X's on nuts as indicated by the number in the upper right corner. Then have them write the corresponding subtraction sentence.



Unit 6 Overview

This unit extends the use of number sentences to represent subtraction for minuends to 9. The vertical form for subtraction is also presented. The concepts of addition and subtraction are reinforced through illustrations depicting the joining and the separating of sets for which the children write appropriate number sentences. Another lesson challenges the children to decide whether addition or subtraction relates three given numbers for a number sentence. Exercises are provided throughout the unit for practice in the two operations. Skills in subtraction are applied in making purchases involving amounts of money to 9 cents. Non-standard units of mass and length are used for measuring activities in preparation for the introduction of standard units in subsequent lessons. Children follow oral instructions to make shapes on geoboards. The skill of solving a problem by choosing one of several alternatives is developed by finding a path through a maze. The *Checkup* deals primarily with the operations of addition and subtraction for sums and minuends to 9.

Unit Outcomes

Number

- complete subtraction sentences for minuends to 9
- use the vertical form for subtraction
- interpret illustrations of additive and subtractive situations and write the corresponding number sentences
- decide whether + or - is needed to complete a number sentence
- complete addition and subtraction sentences for sums and minuends to 9

Measurement

- use subtraction with amounts of money to 9 cents
- find the mass of an object using non-standard units of mass
- measure using parts of the body as non-standard units of length
- measure using non-standard units of constant length

Geometry

- make shapes on a geoboard according to given instructions

Logic

- choose alternatives in a problem situation

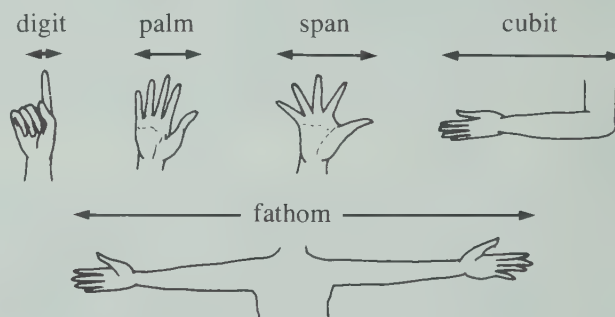
Background

Number: As children work more and more with subtractive situations, they should be able to move from the concrete level at which they handle objects, through a stage where illustrations and semi-abstract symbols depict the removal of objects, and from there to the abstract level at which only the numerals and symbols are used. This transition should not be rushed although some children will reach the abstract level more quickly than others. Children should be able to demonstrate their understanding of subtraction sentences both concretely and pictorially. Unless this level of response is reached, children may not know whether addition or subtraction is required to solve even the simplest of problems. Pictorial and concrete representations should be accompanied by verbal descriptions in the form of "stories". The symbols + and -

may also become confusing unless sufficient actions of joining and separating sets have been associated with their use.

Children may have had enough experiences by now with zero in addition and subtraction facts to enable them to verbalize a generalization. Children might say, "When you add zero to a number, the number doesn't change." (The term *identity element for addition* describes this property of the number zero.) It is not necessary for children to memorize many number facts in which zero occurs because an understanding of the property can cover all situations. Other experiences that the children may be ready to generalize upon concern subtraction with zero: (1) any number subtracted from itself gives zero, as in $4 - 4 = 0$; (2) zero subtracted from any number does not change that number, as in $6 - 0 = 6$.

Measurement: In previous units the children had informal experiences with the concept of length. In this unit they are involved in measuring length (finding how many times the object being measured contains a chosen unit), but no standard units are used. A discussion of suitable units (non-standard) for measuring length will make it obvious that the most natural and readily available units are parts of the body. Historically, the earliest measurements were limb measurements such as the following:



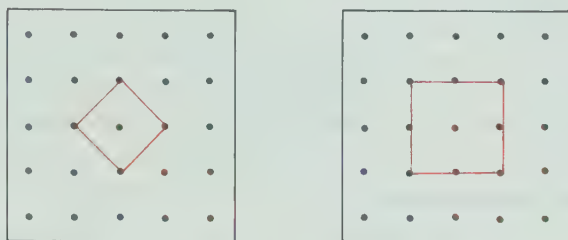
Since the suggested activities involve some of the above units as well as the *pace*, children, in a sense, are repeating history.

Use of parts of the body as units for measuring length will soon prove to be unsatisfactory and unreliable because of variations in size from one person to another. More uniform non-standard units can then be introduced from the classroom environment, such as toothpicks, paper clips, pencils, drinking straws, skipping ropes, hockey sticks, and baseball bats.

One difficulty encountered in measurement is that of selecting an appropriate unit. A toothpick may be satisfactory as a unit to measure the length or the width of a book, but it is not very practical for measuring the dimensions of a classroom. Also, in determining the number of units used, or the number of times the unit is repeated, one cannot be certain of getting a whole number each time. Thus, children can discover that measurements are not exact—only approximate. From this kind of experience, they will learn to estimate measurements as being *about* so many units and also to express measurements to the nearest number, if necessary.

The topic of mass was introduced in Unit 4. At that time the children had experiences in determining which objects were lighter than or heavier than others. Now the children are asked to decide which objects have about the same mass and to describe the relationship using the term "as heavy as". (The basic differences between mass and weight are explained on page T84.)

Geometry: In previous units the geoboard has been used by the children for reproducing given shapes. It has also been used for them to become acquainted with the number of sides and the number of corners of two-dimensional shapes and points in the interior and exterior regions of the shapes. In these cases the geometric shapes were provided. In this unit the children are challenged to make shapes according to given instructions. The possibilities are numerous and the work on page 123 should be extended by using instructions similar to those suggested in *Related Activities*. Children should be encouraged to find more than one way to satisfy given instructions. Two examples are shown below for a square having one peg inside it.



Logic: Logical reasoning as part of mathematics has become increasingly important because of its value in developing the ability to solve problems. In previous units, activities with attribute blocks helped to develop an awareness of shape, size, and number. At the same time, children were introduced to logical reasoning when they were involved in recognizing different attributes and establishing similarities and differences. In Unit 6 the maze is introduced for further experience in logical reasoning as children are required to select alternative paths in the maze. If children are encouraged to think and reason independently, they may become more self-sufficient and develop greater confidence in coping with everyday experiences.

Teaching Strategies

Grouping for instruction in topics dealing with number should be followed if used for previous units. Different groupings may be used for the topics listed under measurement, geometry, and logic, as these are not dependent on number concepts and skills.

Small groups are recommended for the work with geoboards on page 123 because the instructions must be given orally. Small groups also allow observation of how each child responds to the instructions. This topic might be spread over several days with non-directed groups doing the practice exercises on pages 120, 121, and 122 while directed groups work with geoboards. The practice exercises should not require the personal attention and supervision of the teacher after the procedures for doing them have been discussed.

Before the work of Unit 6 is formally begun, place balance scales and objects suitable for comparing masses in one part of the classroom. Children may experiment freely to discover what happens when two objects of different masses are compared and when two objects of the same mass are compared. Non-standard units of mass may be acorns, chestnuts, pennies, Plasticine balls, stones, metal washers, nails, and so on. Children may be interested in balancing an object several times, using different non-standard units.

Materials

display board and cutouts (some fish shapes)
a maze for demonstration, overhead projector (optional)
items for making sets, devices for set holders, string or yarn
cards showing addition and subtraction phrases
counters and crayons for each child
real money, play money, coin cutouts from copies of page T337
items with tags showing prices from 1¢ to 9¢ for the play store
stones, metal washers, Plasticine balls, objects for comparing masses
balance scales
drinking straws, tongue depressors, a piece of ribbon, masking tape, paper clips, classroom objects to be measured
number concept cards for 0 to 9 for each child
geoboards, rubber bands, copies of page T332
flash cards having triangular, square, and rectangular shapes
two sets of numeral cards for 0 to 9, a card for each of the symbols +, -, and =

Vocabulary

as heavy as	length
balance scales	distance
measure	about
span	maze
pace	

Unit 6 Theme – The Sea

The purpose of this theme is to acquaint the children with some of the forms of life that inhabit the sea: fish, shells, corals.

Set up a display to arouse the children's interest in the sea. Cover a table or other flat surface with blue cotton or other suitable fabric. On this background, display shells, starfish, corals, sponges, and, if possible, diving equipment.

Plastic models of fish may be obtained from variety stores or the toy departments of large stores. Also include books about the sea. Place pictures of underwater life, tropical fish, and cork floats on the wall or on charts. If possible, obtain a fish net for the wall. This will make an ideal place to fasten cards showing the new words that the children learn from this theme.

LANGUAGE ACTIVITIES

1. Facts About Fish

Read to the children or tell them about tropical fish in general. The follow-up discussion should bring out attributes that are common to all fish. Include questions similar to the following:

“How do fish breathe?” (You may wish to introduce the words *gills* and *oxygen*.)

“How do we know when a fish is breathing?”

“How does a fish choose the direction in which it swims?”

(Point out the tail and *fins* on a picture of a fish.)

“How is a fish protected as it swims among the sharp rocks and coral?” (Introduce the word *scales*. Make a drawing to show how scales overlap.)

“How is a fish protected from its enemies?” (This should recall the idea of protective coloring introduced in the theme about animals.)

2. Facts About Shells

Read from a book that will introduce the children to several types of shells. Have different shells for the children to examine. Include questions similar to the following in the discussion:

“What do you hear when you hold a conch shell to your ear and what does the sound remind you of?”

“What lives inside a shell?”

“How do shells move?”

“Why are shells colored the way they are?”

“Which animals that are protected by shells are good to eat?”

3. Setting up an Aquarium

Read to the children or tell them about the essential elements for life in and under the sea. Ask the children what would have to be done to care for fish properly in the classroom. Lead a discussion to bring out the need for a proper container, suitable water temperature, a supply of oxygen and food, compatibility of the fish and the environment.

Prepare a chart and have the children suggest a step-by-step method for setting up an aquarium. Use this chart as a reference when setting up an aquarium in the classroom.

4. A Sound Poem

Read the poem *Waves* by Eleanor Farjeon to the children. Discuss the kinds of activities that the children enjoy in the

water at the beach. Record all the words that the children know for describing waves and water. Arrange these words to make a poem about waves. Have the children read the poem together in several different ways. Have groups of children read the poem at the same time.

5. Rescue Bottles

Tell the children about the custom of shipwrecked persons writing notes for help, placing them in bottles, and casting the bottles out to sea. Have the children imagine that they are in such a situation and write notes telling where they are and why they need help.

Cut bottle shapes from thin cardboard and make a “pocket” in each one. Have the children roll their notes and place them “in the bottles”. They may then exchange bottles and read each other's notes. You may wish to make a sea scene on a bulletin board to display the bottles and the “enclosed” notes.

6. Loch Ness Monster

Read to the children some of the stories and reports about the Loch Ness Monster, referred to affectionately by believers as “Nessie”. After the children have been given the background information have them draw a picture of what they imagine “Nessie” to look like. Use the drawings to make a “Nessie” display.

MATHEMATICS ACTIVITIES

1. Classifying

Ask the children to identify in the sea display some groups of things that can be sorted. They may suggest the shells, coral, and plastic fish. Record these classifications on a chart. Ask the children to suggest ways in which each group could be sorted. Record these ways under each classification. Have the children do the sorting either individually or in small groups. You may wish to have some of the children record their findings.

2. Measuring

Many items in the sea display will make ideal non-standard units of length. Have each child select an item that he / she can identify. Have each child use this item to measure at least three things in the classroom and record the measurements. You may wish to have the children estimate the lengths before they measure them. A record sheet might show the following information:

My book is 3 scallop shells long.

My foot is 2 scallop shells long.

My desk is 10 scallop shells high.

3. Graphing

Have each child choose a kind of fish and cut one from construction paper. When the children have completed the fish, have them arrange the fish from longest to shortest on a strip of paper so that the tails are aligned on a common base line. Draw a horizontal line about 5 cm long at the head of each fish as a guide for comparing lengths. Record the child's name at the tail of her / his fish. Discuss relationships that are apparent from the graph, for example, the longest fish, the shortest fish, the fattest fish, the fish that have the same length.

4. Solving Problems

Have the children create, illustrate, and solve word problems suggested by this theme. You may wish to have them draw pictures that suggest joining or separating situations. These drawings can then be exchanged for interpreting and solving a problem.

5. Shape Pictures

Provide the children with gummed shapes or rectangular, square, triangular, and circular shapes cut from construction paper. Have the children glue the shapes on a sheet of paper to create an under-the-sea picture. The background may be filled in using crayons or colored pencils.

6. Catching Number Fish

From construction paper, cut out about 30 fish shapes. On some of the paper fish, draw from 0 to 9 dots; on others, write the numerals 0 to 9. Fasten a paper clip to the mouth of each fish. Place all the fish in a pail or a tub. To make a rod, tie a small magnet to a string and tie the other end of the string to a dowel. Have the children take turns at "catching" pairs of fish. When all the fish have been "caught", ask the children to count their pairs of fish. The player with the most pairs is the winner.

SCIENCE ACTIVITIES

1. Will It Sink or Float?

Select ten items from the sea display. Prepare a large acetate-covered chart with two columns labelled "Will Sink" and "Will Float". Check to see whether the children know the meaning of each word. Have the children predict whether an item will sink or float when placed in water. Record the predictions on the chart. When the chart is completed, test each item in a sink or a pan of water. Discuss the results and have the children count how many of their predictions were correct.

Have the children repeat this activity individually, predicting first and then testing. They may record their findings either pictorially or in words.

2. Sand

Read to the children or tell them how sand is formed. Provide samples of various grades and colors of sand, from the coarse sand of the seashore to the fine silica used in ash trays. Have the children describe the feel of each sample. Ask them to explain the differences in color. List some of the things sand is used for. Have the children observe what happens when water is poured on the samples.

3. Salt Water and Fresh Water

Explain that a body of water may be either fresh water or salt water. The water in the oceans is salt water. Make up a brine solution in a container and provide a container of fresh water. Have the children taste the liquid in each container and describe the differences in taste. Place some of the salt water in a flat dish and leave it to evaporate. When the water has evaporated, have the children taste the residue. Repeat the experiment with fresh water. Discuss whether the two results are the same and why they are not.

4. An Experiment

Ask the children whether they think it might be easier to swim in salt water than in fresh water. To demonstrate the

correct answer you will need two transparent tumblers containing about 200 mL of water each, two eggs, and two tablespoons of salt.

Dissolve the salt in one of the tumblers of water. Place one egg in the tumbler of salt water and the other egg in the tumbler of fresh water. The egg placed in the fresh water will sink, but the egg placed in the salt water will tend to float.

Another way to demonstrate that objects tend to float in salt water is to use two identical pencils with erasers and two thumbtacks. Push a thumbtack into the eraser of each of the two pencils. Place one pencil in the tumbler of salt water and the other pencil in the tumbler of fresh water. Lead the children to observe that the pencil in the salt water floats at a higher level than the pencil in the fresh water.

5. Water Conservation

Children are aware of how to conserve electricity and fuel. Ask them to think of ways to conserve water. Their suggestions should include the following:

- Use less water when taking a bath or a shower.
- Stack the dirty dishes from meals and snacks and wash them only once or twice each day.
- Use a tumbler of water when brushing your teeth rather than letting the water continue to run from the tap.
- Keep a supply of drinking water in the refrigerator rather than letting the water run from the tap until it is cold when getting a drink of water.
- Watch the weather and listen to the weather reports to avoid watering the grass just before rain showers.

6. Life in Miniature

Algae, the most primitive of all plant life, can be found within easy reach of your classroom. The children will have fun finding algae if you tell them that it is the green slippery scum that can be found in ponds, in bird baths, on rocks beside streams, and in aquariums. Ask the children to collect samples and label each one to say where they found it. Put a small sample on a glass slide and let the children look at it under a microscope. They will be able to see the difference between the sample of algae from the bird bath and the sample of algae from a pond.

SOCIAL STUDIES ACTIVITIES

1. Underwater Environment

Show the children pictures of plants and animals living at the bottom of the sea. Have the children pretend to be sea creatures and discuss with them what their existence is like; for example, how they get food, how they protect themselves, how they depend on other creatures.

2. Protective Color and Covering

Review the idea of protective coloring as introduced in the theme about animals. Discuss whether sea creatures also have protective coloring. During the discussion, you may wish to mention facts such as the following:

Fish swim in groups called *schools*.

Large fish eat smaller fish.

Rocks and coral are often brightly colored.

Some sea creatures have other ways of protecting themselves:

The sea horse has a bony skeleton.

The octopus can make the surrounding water inky.

The sea urchin has prickly spines.

Shells are strong and hard, and those that are hinged close very tightly.

Have the children make a tabletop display using Plasticine to illustrate the concept of protective colors and distinctive markings.

3. Deep-Sea Diving

Review the ways in which certain animals and fish are designed to live in water. People are not designed to live under water. Ask the question, "What special things are required if people wish to spend time under water?"

During the discussion lead the children to suggest the need for oxygen tanks or air lines for breathing, special rubber suits for warmth and protection, fins or flippers for ease of movement.

Have the children suggest reasons why people like to spend time deep-sea diving.

4. Food from the Sea

Mention to the children that the sea provides many items in our daily diet. Have the children suggest things to eat that come from the sea. List these things on a chart. After the list has been completed, you may wish to have the children classify the things into various categories.

From magazines, have the children cut out pictures of food from the sea. Display the pictures on a chart.

Make a collection of cans and containers for seafood. You may wish to provide examples for the children to taste. Some of these may be unfamiliar to the children, so give each child only a small taste at first.

If possible, visit a fish store and let the children see the different kinds of fish available, and how they are offered for sale.

ART ACTIVITIES

1. Stuffed Fish

Have each child draw the outline of a large fish on kraft paper or other thick paper. The child then cuts out two of these fish and places staples about 2 cm apart around the edge, leaving an opening on the underside of the fish. Show the children how to stuff each fish through the opening with crushed newspaper and then staple the opening shut. Have the children paint the fish. You may wish to hang these fish from the ceiling of your classroom.

2. Seascape

Have each child draw and color a large fish on Manila paper. Encourage the children to press firmly with the crayons to produce solid, vibrant colors. Have the children draw a background of shells and seaweed with the crayons. Make a wash of thin, blue tempera paint. Have each child paint this wash over the entire paper. The wax from the crayons will resist the paint, producing an underwater effect.

3. Tissue Collage

Tear colored tissue into bits about half the size of your hand. Dilute white glue with water until it flows easily.

Have each child draw an outline of a fish on a sheet of white paper and then fill in the outline with the tissue. The children should first paint glue over the fish, place bits of the torn tissue inside the outline of the fish, and then cover the tissue pieces

with another coat of glue. As different colors are overlapped, the colors will blend, creating a muted effect. Various shades of blue painted or placed around the fish will suggest that the fish is in the sea.

You may prefer to have the children create one group picture rather than individual pictures.

4. Shell Act

Some children in your class probably have shells they have collected or some they have been given by friends or relatives. These children may be interested in enhancing their shells and preparing them for display.

Small shells can be prepared by soaking them in a weak solution (4%) of alcohol for several days. (This step should be done by an adult.)

Large shells can be placed in a pot of cold water that is then brought to the boiling point. Leave the shells to cool in the water. The next step is to soak the shells in a weak solution of bleach until the dirt and any growth can be brushed off.

After the shells have been cleaned and dried thoroughly, they may be brushed lightly with salad oil to bring out their natural colors and beauty. The shells could be coated with shellac, but this gives them an unnatural, glossy appearance.

MOVEMENT ACTIVITIES

1. Sea Setting

Divide the children into two groups—the members of one group to represent things that move and the members of the other group to represent things that do not move. Have the "rocks, shells, and coral" assume positions while the "fish" move in and out among them. Then have the groups exchange roles.

2. Wave Moods

Describe different ways in which waves behave; for example, gently lapping on the beach, rolling in as breakers, and crashing against the rocks in a storm. Have the children move in these different ways.

As an extension of this activity, you may wish to play a record or provide other music for the children to interpret the mood of the sea.

3. Dance a Story

Tell a story of children playing on the beach and collecting sea shells. Ask the children to think about the movements involved. Tell the story again as the children act it out through movement. Encourage a variety of light, flowing motions.

MUSIC ACTIVITIES

1. Listening to the Sea

Select a record or a piece of music that creates illusions of the sea. Wagner's "Flying Dutchman Suite" would be a good choice. Have the children describe the various moods of the sea as the music changes.

2. Sea Story

Create a sea story with the children. Add sound effects as the story develops. Encourage the children to discover different ways of producing water sounds. When the story is complete with the sound effects, record it on tape. You may wish to present the story to another class.

LESSON OUTCOME

Complete subtraction sentences for minuends to 5

Materials

loop of string, display board and cutouts, counters for each child

RELATED ACTIVITIES

- Throughout the day, ask children in turn to tell you a story problem for a subtraction sentence selected from those on page 108. The story should be related to the theme *The Sea*. For $4 - 3 = 1$, for example, a child might say, "I saw four boats. Three boats sailed away. One boat was left."
- From a set of dominoes remove the pieces that indicate a sum greater than nine. Distribute a domino piece to each child. Have the children use their counters to copy the two dot patterns. Then have them remove the counters for the dot pattern that indicates the lesser number. Ask the children to write the corresponding subtraction sentence. If you wish, have the children also remove counters for the dot pattern that indicates the greater number, and write the corresponding number sentence. The children may exchange domino pieces and write several subtraction sentences.

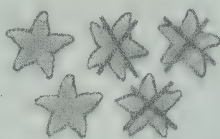


$$9 - 4 = 5$$

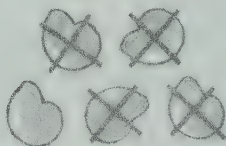
or

$$9 - 5 = 4$$

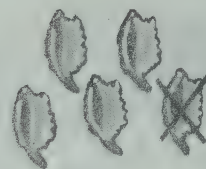
Complete the number sentences



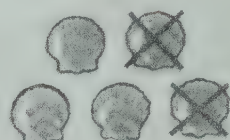
$$5 - 3 = 2$$



$$5 - 4 = 1$$



$$5 - 1 = 4$$



$$5 - 2 = 3$$

$$4 - 3 = 1$$

$$4 - 0 = 4$$

$$5 - 0 = 5$$

$$3 - 1 = 2$$

$$2 - 1 = 1$$

$$5 - 1 = 4$$

$$4 - 1 = 3$$

$$1 - 0 = 1$$

$$5 - 5 = 0$$

$$5 - 1 = 4$$

$$2 - 0 = 2$$

$$5 - 2 = 3$$

$$1 - 1 = 0$$

$$4 - 2 = 2$$

$$3 - 0 = 3$$

$$5 - 3 = 2$$

$$5 - 4 = 1$$

$$4 - 2 = 2$$

$$3 - 3 = 0$$

$$3 - 2 = 1$$

$$5 - 3 = 2$$

$$5 - 5 = 0$$

$$4 - 4 = 0$$

$$2 - 2 = 0$$



108 (one hundred eight)

Subtracting, minuends to 5

LESSON ACTIVITY

Before Using the Page

- Ask five children to stand inside a loop of string. Ask how many children there are inside the loop. Ask two children of the group to move outside the loop. Ask how many children there are inside the loop now. Write $5 - 2 = 3$ on the chalkboard. Have a child complete the subtraction sentence ($5 - 2 = 3$). Repeat the procedure several times.
- Place five cutouts on the display board. Ask a child to remove one of the cutouts. Ask how many cutouts are left. Have one child state the subtraction sentence ($5 - 1 = 4$) and another write the sentence on the chalkboard. Repeat the procedure by having children in turn remove two, three, four, five, and zero cutouts to illustrate all the possible subtraction sentences for minuends of 5.
- On the chalkboard, write a subtraction phrase with a minuend of 5 or less, for example, $4 - 1$. Have three children work on the chalkboard, one to draw a set of four objects, another to mark an X through one of the objects, and a third to

complete the subtraction sentence ($4 - 1 = 3$). Ask the first child to point to the drawing and explain what it illustrates. Repeat for several other examples.

Using the Page

- Direct the children's attention to the sailboats at the bottom of the page. Ask how many sailboats there are, how many sailboats are red, and how many sailboats there would be if the two red sailboats were taken away. Tell the children that this page is about subtracting from numbers to five.
- For the first exercise, ask the children how many starfish there are and how many starfish are crossed out. Ask how many starfish are not crossed out. Have the children trace over the dotted 2. Discuss the second exercise in a similar way and then let the children work on their own.

As the children complete each subtraction sentence, they should say silently, for example, "There are five shells. Four are crossed out. One is not crossed out. Five minus four equals one."

- For the second part of the page, the children may use their own counters or they may use the five sailboats.

LESSON OUTCOME

Complete subtraction sentences for minuends to 6

Materials

display board and cutouts

RELATED ACTIVITIES

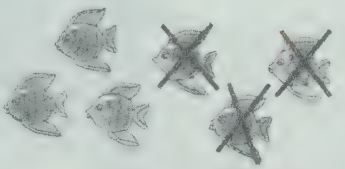
- After the children have completed the page, ask them to ring the seven possible subtraction sentences for a minuend of 6. Have the children list these seven subtraction sentences in the order $6 - 0 = 6$ to $6 - 6 = 0$.
- Prepare work cards showing subtractive situations and having acetate overlays. The children can write the number sentences, have their work checked, and then erase the marks so that the card will be ready for the next child to use.



4



1 5



6 3 3

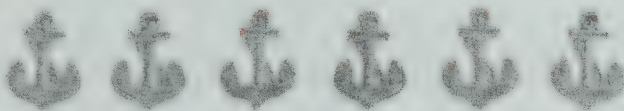


6 4 2

1
3
2
0
4
3
5
3

2
2
3
2
4
1
1
5

0
0
0
4
0
1
6
1



Subtracting, minuends to 6

(one hundred nine) 109

LESSON ACTIVITY

Before Using the Page

- Ask six children to stand together at the front of the classroom and then ask two children to leave the group. Ask how many children are left in the group. Have one child state the subtraction sentence ($6 - 2 = 4$) and a second child write the sentence on the chalkboard. Repeat the procedure.
- Place cutouts of six fish inside a loop of string on the display board. Have the children state how many fish there are "in the sea". Say that a shark came along and ate one of the fish. Remove one fish. Ask how many fish there are now in the sea. Ask one child to tell what happened and have others write the subtraction sentence ($6 - 1 = 5$). Repeat the procedure by having children in turn remove two, three, four, five, six, and zero fish to illustrate all the possible subtraction sentences for minuends of 6.
- On the chalkboard, write a subtraction phrase with a minuend of 6 or less, for example, $5 - 2$. Have three children work on the chalkboard, one to draw a set of four objects,

another to mark X's through two of the objects, and a third to complete the subtraction sentence ($5 - 2 = 3$). Ask the first child to point to the drawing and explain what it illustrates. Repeat for several other examples.

Using the Page

- Direct the children's attention to the anchors at the bottom of the page. Ask how many anchors there would be if three were taken away. Tell the children that this page is about subtracting from numbers to six.
- For the first exercise, ask the children how many crabs there are and how many crabs are crossed out. Ask how many crabs are not crossed out. Have the children trace over the dotted 4. Discuss the second exercise in a similar way and then let the children work on their own.

As the children complete each subtraction sentence, they should say silently, for example, "There are six snails. One is crossed out. Five are not crossed out. Six minus one equals five."

- For the second part of the page, the children may use their own counters or they may use the six anchors.

LESSON OUTCOME

Complete subtraction sentences for minuends to 7

Materials

counters for each child

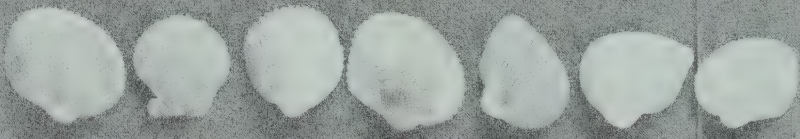
RELATED ACTIVITIES

- Prepare a work sheet as shown and distribute a copy to each child.

$7 - 5 = \underline{\quad}$	$6 - 2 = \underline{\quad}$
$5 - 1 = \underline{\quad}$	$5 - 3 = \underline{\quad}$
$6 - 5 = \underline{\quad}$	$7 - 6 = \underline{\quad}$
$6 - 3 = \underline{\quad}$	$4 - 2 = \underline{\quad}$
$6 - 4 = \underline{\quad}$	$7 - 4 = \underline{\quad}$
$3 - 1 = \underline{\quad}$	$7 - 3 = \underline{\quad}$
$4 - 3 = \underline{\quad}$	$5 - 2 = \underline{\quad}$
$5 - 4 = \underline{\quad}$	$2 - 0 = \underline{\quad}$

Have the children complete the subtraction sentences and then color inside the rectangles according to the following code for the answers:
1 blue, 2 red, 3 green, 4 yellow.

Complete the number sentences.



$3 - 1 = \underline{2}$	$5 - 4 = \underline{1}$	$2 - 0 = \underline{2}$
$4 - 3 = \underline{1}$	$5 - 1 = \underline{4}$	$7 - 4 = \underline{3}$
$6 - 1 = \underline{5}$	$6 - 0 = \underline{6}$	$4 - 2 = \underline{2}$
$6 - 5 = \underline{1}$	$7 - 3 = \underline{4}$	$7 - 2 = \underline{5}$
$5 - 2 = \underline{3}$	$7 - 4 = \underline{3}$	$3 - 0 = \underline{3}$
$7 - 6 = \underline{1}$	$3 - 2 = \underline{1}$	$7 - 7 = \underline{0}$
$6 - 4 = \underline{2}$	$7 - 1 = \underline{6}$	$7 - 6 = \underline{1}$
$7 - 0 = \underline{7}$	$4 - 1 = \underline{3}$	$7 - 1 = \underline{6}$
$6 - 3 = \underline{3}$	$1 - 0 = \underline{1}$	$4 - 0 = \underline{4}$
$5 - 5 = \underline{0}$	$5 - 3 = \underline{2}$	$7 - 5 = \underline{2}$
$7 - 2 = \underline{5}$	$2 - 1 = \underline{1}$	$2 - 2 = \underline{0}$
$7 - 5 = \underline{2}$	$6 - 2 = \underline{4}$	$7 - 3 = \underline{4}$

110 (one hundred ten) Subtracting, minuends to 7

LESSON ACTIVITY

Before Using the Page

- Make up a story problem; for example, "I found seven shells on the beach. I gave four of them to my friend. How many shells did I have then?"

Ask the children to display seven counters to represent the shells. Then have them remove four of the counters and state how many counters are left. Ask a child to write the subtraction sentence on the chalkboard. Repeat the problem so that the children will be subtracting the numbers from zero to seven from seven. Ask a child to write each subtraction sentence on the chalkboard.

- Ask one child to tell a story problem about finding shells on the beach. Have the other children use their counters to help them determine the subtraction sentence. Then ask one child to write the subtraction sentence on the chalkboard. (Note that the number of shells found should be 7 or less.) Have as many children as possible tell a story problem.

Using the Page

- Direct the children's attention to the shells at the top of the page. Ask how many shells there are. Tell the children that this page is about subtracting from numbers to seven. Have the children complete the subtraction sentences according to your instructions (by column, the first seven subtraction sentences in each column, or whatever). You may wish to ask them to complete first the exercises they can without using counters.

- After the children have completed the page, ask them to ring the eight possible subtraction sentences for a minuend of 7. Have the children list these eight subtraction sentences in the order $7 - 0 = 7$ to $7 - 7 = 0$.

- Have the children solve word problems of the following type:

1. There were six shells in a pail. John took three of the shells. Find the number sentence in the first column that tells how many shells were left in the pail.
2. There were five shells in a pile. Ann picked up three of the shells. Find the number sentence in the second column that tells how many shells were left in the pile.

LESSON OUTCOME

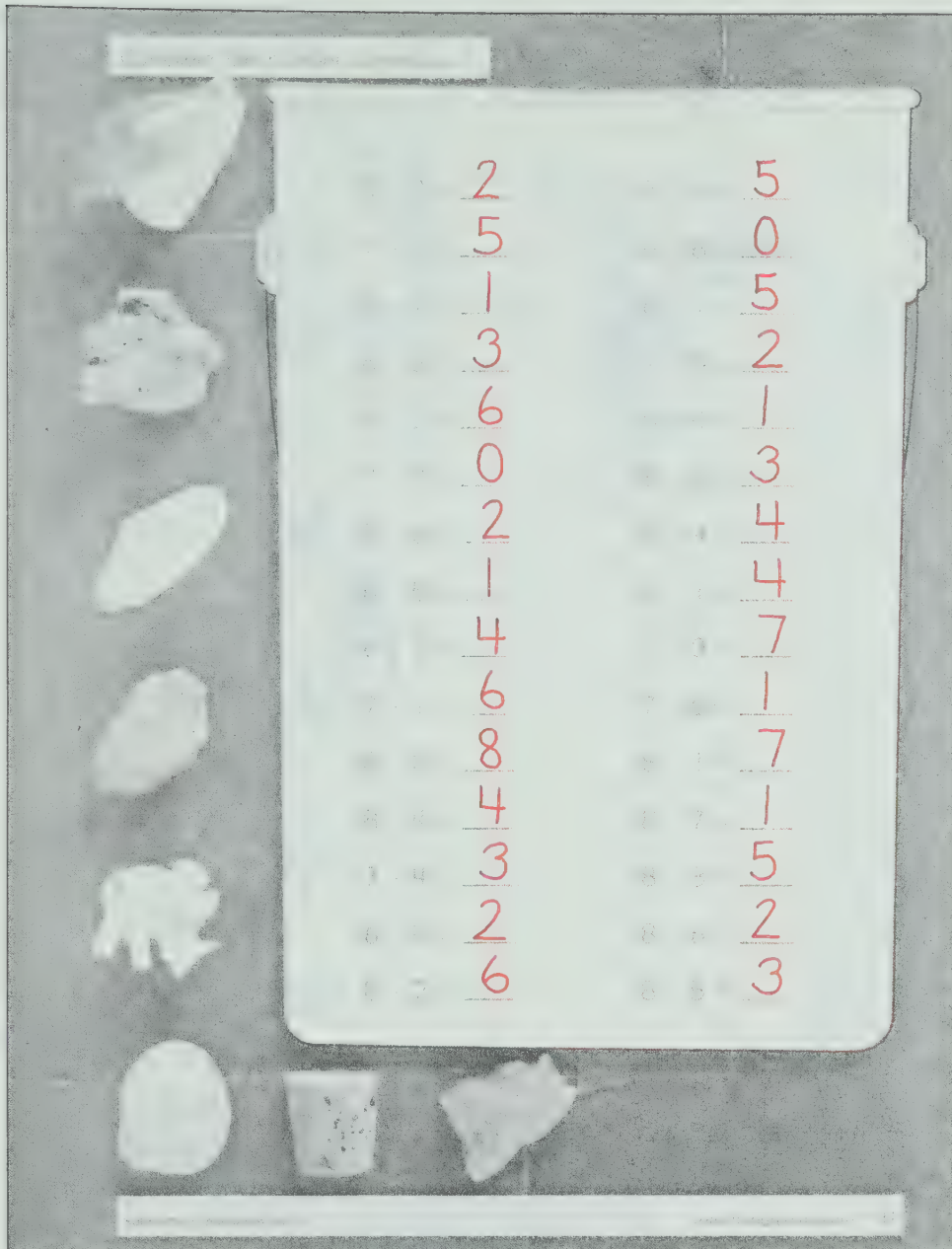
Complete subtraction sentences for minuends to 8

Materials

display board and cutouts, counters for each child

RELATED ACTIVITIES

- Play the game "How Many Fish Can You Catch?" with the children. Draw on the chalkboard seven fish arranged as shown on page T163. Print the numerals 8, 8, 7, 6, 5, 4, and 3 at random on the fish. Draw a fishing line with a baited hook in the middle. Have children pretend to "catch" each fish in turn by subtracting the number on the hook from the number on each fish: for example, "Five minus three equals two." Change the number on the bait to 2 and have the children "catch" more fish.



LESSON ACTIVITY

Before Using the Page

- Ask eight children to form a group at the front of the classroom. Tell them that you are going to call out a number, for example, 3. That number of children should leave the group. Ask other children how many there were in the group at first, how many children went away from the group, and how many children are left in the group. Ask a child to write the subtraction sentence on the chalkboard ($8 - 3 = 5$). Repeat the procedure to obtain all the possible subtraction sentences for a minuend of 8.
- Place eight cutouts on the display board. Have children remove cutouts so that each possible subtraction sentence for a minuend of 8 is considered. Have a child write each subtraction sentence on the chalkboard.
- Write a subtraction sentence on the chalkboard (minuend of 8 or less) and have children use their counters to illustrate it. Repeat several times for other subtraction sentences.

Using the Page

- Direct the children's attention to the objects that one finds on the beach. Ask how many objects there are. Tell the children that this page is about subtracting from numbers to eight. Have the children complete the subtraction sentences according to your instructions (by column, the first eight subtraction sentences in each column, or the ones they know best first).
- After the children have completed the page, ask them to ring the nine possible subtraction sentences for a minuend of 8. Have the children list these nine subtraction sentences in the order $8 - 0 = 8$ to $8 - 8 = 0$.
- Have the children solve word problems of the following type:
 1. Joan saw six white stones in the sand. She picked up two of them. Ring the number sentence in the first column that tells how many of the white stones were left in the sand.
 2. Jim found five shells under a rock. He put one shell in his pocket. Ring the number sentence in the second column that tells how many of the shells Jim left under the rock.

LESSON OUTCOME

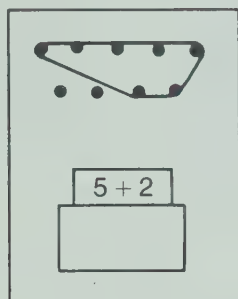
Complete subtraction sentences for minuends to 9

Materials

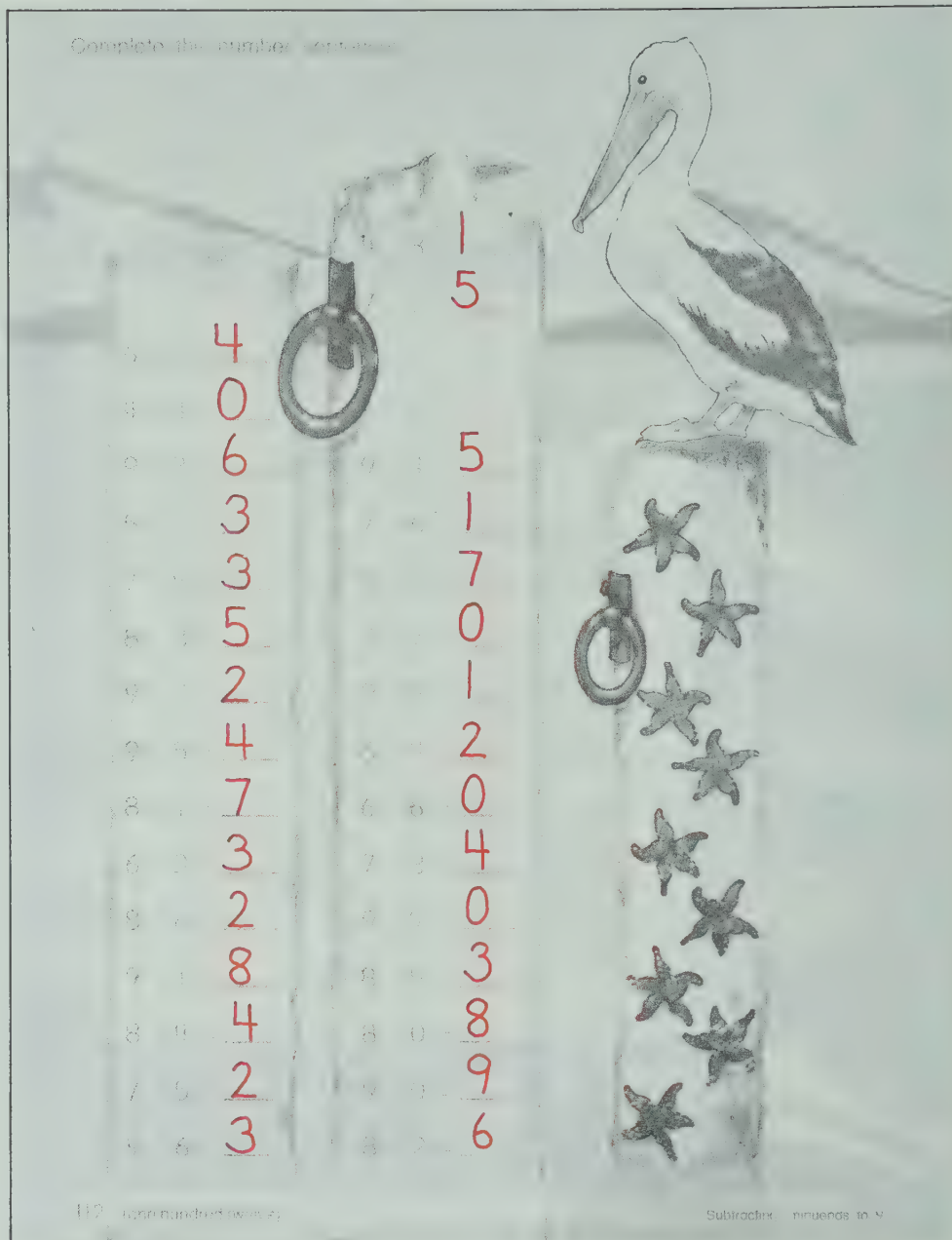
display board and cutouts, counters for each child

RELATED ACTIVITIES

• For children who still need to work with counters, you might make a board with nine nails arranged in two rows of five and four as shown. A pocket holds cards showing addition and subtraction phrases.



A child takes a card, for example, $5 + 2$. The child puts a rubber band around five nails and then stretches it to include two more nails. The addition sentence is recorded on a piece of paper. If the card shows, for example, $5 - 3$, a rubber band is placed around five nails and then removed from three of the nails. The subtraction sentence is recorded as before.



LESSON ACTIVITY

Before Using the Page

- Ask nine children to form a group at the front of the classroom. Tell them that you are going to call out a number, for example, 3. That number of children should leave the group. Ask other children how many went away from the group and how many children are left in the group. Have a child write the subtraction sentence on the chalkboard ($9 - 3 = 6$). Repeat the procedure to obtain all the possible subtraction sentences for a minuend of 9.
- Place nine cutouts on the display board. Have children remove cutouts so that each possible subtraction sentence for a minuend of 9 is considered. Have a child write each subtraction sentence on the chalkboard.
- Write a subtraction sentence on the chalkboard (minuend of 9 or less) and have children use their counters to illustrate it. Repeat several times for other subtraction sentences.

Using the Page

• Direct the children's attention to the starfish on the post. Ask how many starfish there are. Tell the children that this page is about subtracting from numbers to nine.

This is a page for which you could prepare several answer sheets for the children to check their own work.

- After the children have completed the page, ask them to ring the nine possible subtraction sentences for a minuend of 9. Have the children list these nine subtraction sentences in the order $9 - 0 = 9$ to $9 - 9 = 0$.
- Have the children solve word problems of the following type:
 1. There were nine starfish on a post. Four of the starfish fell off. How many starfish were on the post then?
 2. There were six fish in a group. The pelican caught two of them. How many fish were there then?

Materials

RELATED ACTIVITIES

- If you made the addition board suggested on page T121, make another set of labels with a subtraction example in vertical form on each. Have the children hang a label on a hook so that the correct answer appears below the label.
- Adapt the sailboat activity described on page T109. Put the sailboats together so that the number of dots in all is not greater than 9 for each sailboat. Give one sailboat to each child. Have the children remove the boat and record the subtraction example in vertical form. The children should follow the rule that the total number of dots on the sailboat is written first, and the number represented on the boat is subtracted from it.
- Play the game "Matchmates" described on page T163.

Before Using the Page

Diagram 1: 5 blocks, 2 blocks being removed.

Diagram 2: 5 blocks, 2 blocks circled, arrow pointing to Diagram 3.

Diagram 3: 3 blocks.

as the number sentence; that is, “Five minus two equals three.” Display other sets of cutouts and have the children write the subtraction sentence and the vertical form for each.

Using the Page

- Direct the children's attention to the pieces of bait on the hooks. Ask how many pieces of bait there are and how many pieces are crossed out. Ask how many pieces of bait are not crossed out. Have the children trace over the dotted 2. Discuss the second exercise in a similar way and have the children write the answer.
- Assign the exercises for the children to work independently. Have counters available for those who need them and for those who wish to check their answers.
- After the children have completed the exercises, have them print 1, 2, 3, 4, 5, and 6 to label the rows of exercises. Then have them solve problems similar to the following:
 1. There were eight hooks with bait. Fish took bait from five of the hooks. Find the exercise in row 3 that gives the number of hooks left with bait.

LESSON OUTCOME

Use subtraction with amounts of money to 9 cents


Materials

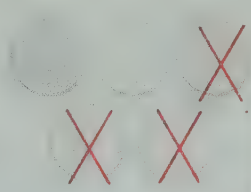

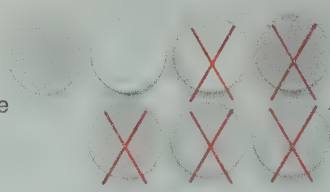

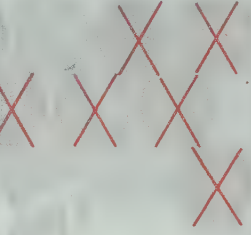
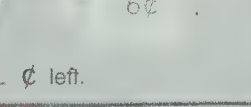
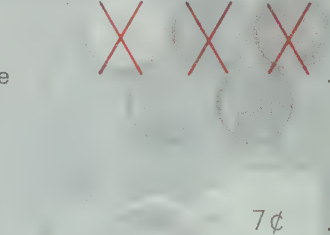
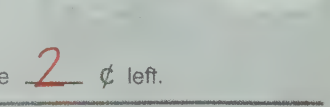



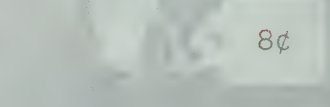
real money, play money, or coin cutouts from copies of page T337, small objects with tags showing prices from 1¢ to 9¢

RELATED ACTIVITIES

- Have the children who are able, write subtraction sentences for the exercises on the page.
- You may wish to make "bills" for the children to use for the play store suggested on page T49. Give each child a "bill" showing the number of cents he / she has to spend. The child chooses the coins needed, then proceeds to buy one item at the store. The child draws a picture of the item on the bill, pays for the item, and records the amount that is left.

I have _____ ¢
I buy _____ ¢
I have _____ ¢ left.

I have 9 ¢
I buy  6 ¢
I have 3 ¢ left.

<p>I have </p> <p>I buy  3¢</p> <p>I have 2 ¢ left.</p>	<p>I have </p> <p>I buy  5¢</p> <p>I have 2 ¢ left.</p>
<p>I have </p> <p>I buy  6¢</p> <p>I have 2 ¢ left.</p>	<p>I have </p> <p>I buy  7¢</p> <p>I have 2 ¢ left.</p>
<p>I have </p> <p>I buy  6¢</p> <p>I have 1 ¢ left.</p>	<p>I have </p> <p>I buy  8¢</p> <p>I have 0 ¢ left.</p>

114 (one hundred fourteen)

Subtraction using money: minuends to 9 cents

LESSON ACTIVITY

Before Using the Page

- Review the values of the penny and the nickel and what the symbol ¢ means. Review the fact that five pennies have the same value as one nickel.
- Display sets of pennies and nickels with values to 9 cents. Have children tell the value of each set of coins.
- Give each child a set of coins consisting of four pennies and one nickel. Hold up an item with a tag showing a price from 1¢ to 9¢. Ask a child to choose the coins necessary to "pay for" the item. Ask the child to state what coins are left and their value. Repeat for other items having prices from 1¢ to 9¢.
- Print the words "I have" on the chalkboard and draw six pennies beside them. Hold up an item having a price of 4¢. Ask one child to cross out the pennies needed to buy the item and state how many pennies are left. Ask another child to state how many cents are left. Print the statement, "I have 2¢ left" on the chalkboard and have the children read it. Repeat for other amounts and items having prices from 1¢ to 9¢.

Using the Page

- Read the words of the first exercise with the children. Have the children mark X's on the coins needed to buy the shell. Ask how many pennies are left and what their value is. Have the children print a 2 to complete the exercise. Read the completed sentence and then let the children continue on their own.
- After the children have completed the exercises, you may wish to have them number the exercises from 1 to 6. Then ask questions similar to the following:
 1. How much does the shell in exercise 3 cost?
 2. How much money was there for spending in exercise 6?
 3. In which exercise does the shell cost the most? the least?
 4. In which exercises do the shells cost the same amount? How much does each shell cost?

LESSON OUTCOME

Demonstrate an understanding of the concept *as heavy as*

Materials

objects for comparing masses: balance scales; stones, metal washers, or Plasticine balls as non-standard units of mass

Vocabulary

as heavy as, balance scales

RELATED ACTIVITIES

- Have the children continue using the balance scales and other small objects. Choose other suitable non-standard units of mass, such as Unifix cubes, for the children to use. Have them record their findings on charts.
- Have the children make two balls of Plasticine that have the same mass. Then have them make two smaller balls from one of the balls and balance the two against the larger ball. By experimenting like this the children can acquire an understanding of conservation of mass.

Ring the stones needed to balance each object.

Introduction to the concept *as heavy as*

(one hundred fifteen) 115

LESSON ACTIVITY

Before Using the Page

- Review the concepts *heavier than* and *lighter than* by having children compare pairs of things, for example, a pencil and a book, or a shoe and an empty can.
- Display an object such as a golf ball. Place a Plasticine ball beside it that you made equal in mass to the golf ball. Have each child hold the golf ball in one hand and the Plasticine ball in the other. Tell the children that the Plasticine ball is *as heavy as* the golf ball. Demonstrate the concept *as heavy as* with other pairs of objects.
- Ask children to select one object from a group of objects and to find some other object in the classroom that is as heavy as the object chosen.
- If balance scales are not available, make simple balance scales for the children to use. (See page T163.) Because this unit is about the sea, you might obtain small smooth stones that are of about the same size and use them as non-standard units of mass. If stones are not available, metal washers or Plasticine balls of the same size will be satisfactory substitutes.

Place a small object in one container of the balance scales. Place a lighter object in the other container. Ask the children how they know which is the heavier object and which is the lighter object. Repeat several times with different pairs of objects.

Place an object in one container of the balance scales and one of the stones or the chosen non-standard units of mass in the other container. Ask which object is heavier. Continue to add non-standard units of mass until the two sides of the balance scales are approximately level. Have the children state, for example, "The ball is as heavy as four stones." Repeat several times.

Using the Page

- Have the children use balance scales and stones (non-standard units of mass) to balance each of the objects shown. If you do not have all the objects suggested on the page, you may wish to prepare a work sheet showing objects that are available in your classroom. Remember that the mass of each object should not be greater than nine non-standard units of mass.

LESSON OUTCOME

Measure using parts of the body as non-standard units of length

Materials

objects to be measured


Vocabulary


measure, span, pace, length, distance

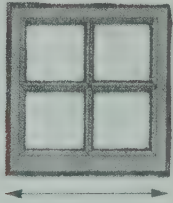
RELATED ACTIVITIES

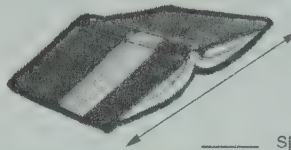
- Help each child cut a piece of string to match her / his height. Then have the children find about how many times the string will fit around their waist and about how many times it will fit around their head or one knee.
- There are other parts of the body that children can use for measuring. (See the comments about measurement in the overview for this unit on page T138.) Make a work sheet showing some of these different units of length and a list of objects or distances to be measured in particular units. Have the children work at this activity in their spare time. You may wish to have them estimate each length first, and then measure to check.
- You may wish to set up distances on the playground for children to measure in paces.

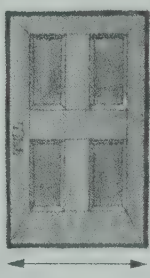
Answers will vary.


Measure.  span

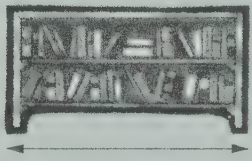
 _____ spans

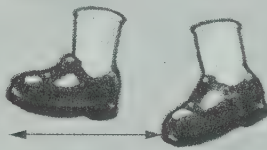
 _____ spans

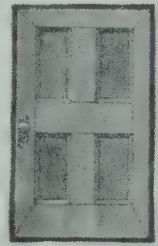
 _____ spans


 _____ spans

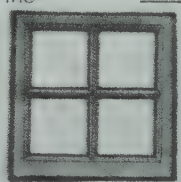
 _____ spans


 _____ spans

Measure.  pace

to the  _____ paces

to the  _____ paces

to the  _____ paces

to the  _____ paces

Measure each object in spans and each distance in paces.

116 (one hundred sixteen) Using parts of the body as non-standard units of length

LESSON ACTIVITY

Before Using the Page

- Have the children look at the chalkboard. Ask for suggestions how you could find how long the chalkboard is. Some children may be familiar with rulers, metre sticks, or tape measures and suggest using these. Tell them that no rulers or tape measures are available. If they then suggest a book or a pencil, ask them to imagine that they have no books or pencils. The idea is to eliminate all man-made items until they finally suggest using parts of the body – arms, hands, feet.
- Have each child hold up a hand and spread the fingers apart. Explain that the distance from the end of the thumb to the end of the little finger is called a *span*. Have the children find objects that are about a span long.
- Draw a long line segment on the chalkboard. Have five children place their hand spans side by side along the line segment to show a length of five spans. Have children demonstrate lengths from one to nine spans. Emphasize the importance of having the fingers touch but not overlap. Ask whether

one child alone can show a length of five spans. Ask a child to demonstrate this. Then have children use their own spans to measure the length of a desk or a table. If all the desks or tables are the same, the children will have an opportunity to discuss why all the answers are not the same. (Some answers differ because individual spans differ.)

- Ask one child to walk slowly, taking several steps, at the front of the classroom. Direct attention to the distance from the toes of one foot to the toes of the other foot. Make a mark at each position. Explain that this distance is called a *pace*. Have other children demonstrate the lengths of their paces. Ask several children to find the number of paces from where they are to some position in the classroom.

Using the Page

- Discuss with the children how each of the six objects is to be measured in spans. Remind them that their spans may not finish exactly at the end of each object. Have them count one more span if the remaining part is almost as long as a span. You may wish to substitute other distances for the four distances to be measured in paces.

LESSON OUTCOME

Measuring using non-standard units of constant length

Materials

a piece of ribbon, drinking straws, or tongue depressors, masking tape, paper clips

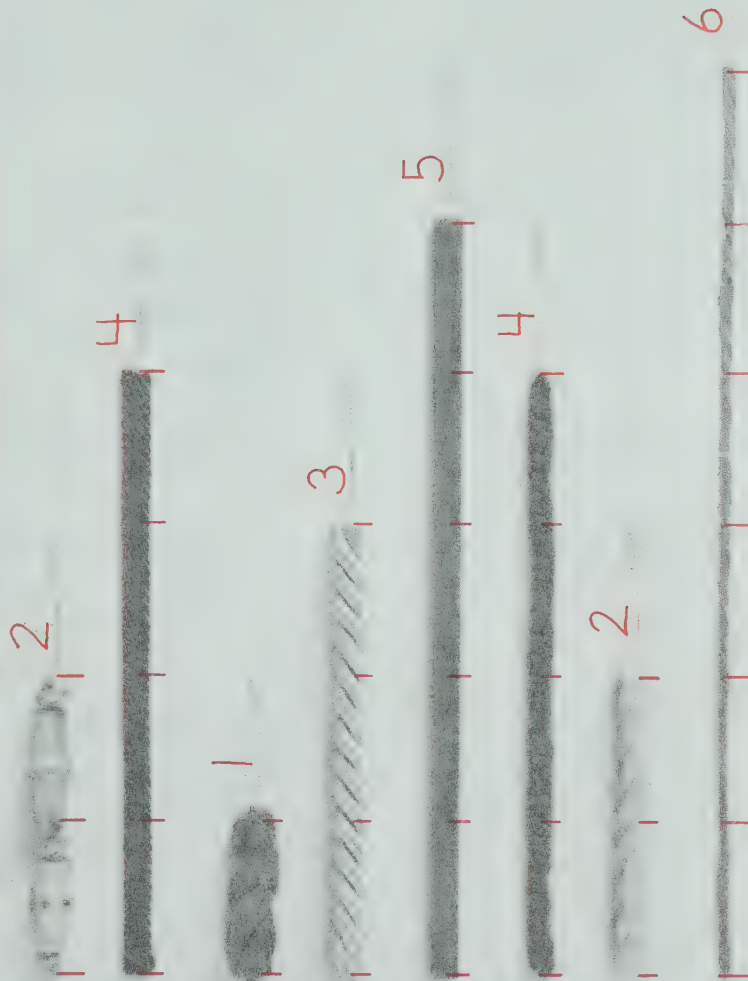
Vocabulary

about

RELATED ACTIVITIES

- Cut pieces of masking tape or strips of paper in various lengths. Attach the masking tape to a desk so that the children can mark it easily. Have the children mark lengths of 1 paper clip, 2 paper clips, and so on.
- Prepare a work sheet showing objects of various lengths. Have the children color the objects according to their lengths. For example, objects that are three units long may be colored red. You may wish to choose convenient units of length other than paper clips, such as nails or pieces of drinking straws, and to have the children estimate the lengths before they measure.

Answers will vary if paper clips shorter than the one shown here are used.

**LESSON ACTIVITY****Before Using the Page**

- In the previous lesson the children discovered that using a part of the body for measuring length gives varying results because of differences in persons.

Have available a supply of straws or sticks all the same length. Tape a piece of ribbon on the chalkboard in a convenient position for measuring. Demonstrate how the end of one straw is aligned with one end of the ribbon. Tape the straw in position. Place one end of a second straw so that it touches, but does not overlap, the end of the first straw. Have several children continue placing straws. After each straw is taped in place, ask if the ribbon is longer than 3 straws, 4 straws, and so on. Depending on the length of the ribbon, you may wish to include another straw and ask if the ribbon is closer to, say, 6 straws than it is to 5 straws.

- Have children measure objects that are either shorter than or longer than a certain number of straws. Have the children say, "The length of the _____ is about _____ straws."

- Lead the children to see that instead of using many straws, the same straw may be used over and over. Align one straw with one end of the ribbon as before. Make a mark at each end of the straw. Place the straw again with one end touching the second mark. Make a third mark. Have a child place the straw again and make a mark. Continue to the end and then have a child count the units between the first mark and the last mark to see how many times the straw was placed. Have one child state, "The length of the ribbon is about _____ straws."

Using the Page

- Provide a paper clip for each child. Have the children turn their books so that the objects will be in a horizontal position. Have the children place one end of the paper clip at the left end of the first object and make a mark at each end of the paper clip. Have them move the paper clip to the next position and make another mark. Ask how long the first object is. Have the children trace over the dotted 2. Read the measurement "2 clips". Then have the children continue on their own. Give children who have difficulty placing the paper clips and making the marks a number of clips to place end to end.

LESSON OUTCOME

Interpret illustrations of additive and subtractive situations and write the corresponding number sentences

Materials

display board and cutouts

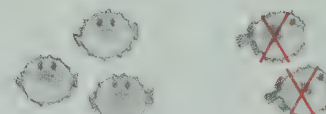
RELATED ACTIVITIES

- Have the children cut pictures from catalogues or magazines to illustrate additive or subtractive situations. If the children paste the pictures on cards, you can ring sets to indicate additive situations and cross out members of other sets to indicate subtractive situations. Have the children work with these cards in their spare time, writing the number sentence that corresponds to the picture or pictures on each card.

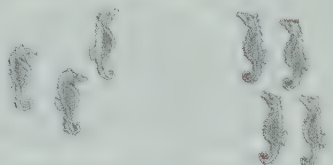
Complete.



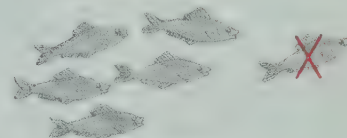
$$2 \text{ } \textcircled{+} \text{ } 1 = 3$$



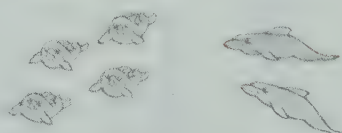
$$5 \text{ } \textcircled{-} \text{ } 2 = 3$$



$$3 \text{ } \textcircled{+} \text{ } 4 = 7$$



$$6 \text{ } \textcircled{-} \text{ } 1 = 5$$



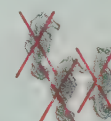
$$4 \text{ } \textcircled{+} \text{ } 2 = 6$$



$$4 \text{ } \textcircled{-} \text{ } 2 = 2$$



$$1 \text{ } \textcircled{+} \text{ } 2 = 3$$



$$3 \text{ } \textcircled{-} \text{ } 3 = 0$$

118 (one hundred eighteen)

Identifying additive and subtractive situations

LESSON ACTIVITY

Before Using the Page

- Display a set of three objects and join another set of four objects to it. Ask one child to tell what happened and whether an addition sentence or a subtraction sentence describes the action. Ask another child to state the addition sentence ($3 + 4 = 7$). Repeat several times for other additive situations.
- Adapt the preceding activity for subtraction. Then create examples of additive and subtractive situations at random until the children appear able to interpret and describe each kind of action. Emphasize that addition is associated with a joining action and subtraction with a separating action.
- Help small groups of children choose and dramatize an additive or subtractive situation to present to the rest of the class. For example, three children may pretend to be eating lunch. Two other children arrive and are invited to share their lunch. After the dramatization have other children describe what happened and state the corresponding number sentence.

Using the Page

• Discuss with the children how to interpret the positions of the sea creatures. In the first exercise at the top left the one whale is entering the "bubble" and is facing the two whales. So we interpret this to mean that the one whale is coming to join the two whales. Ask whether this situation suggests addition or subtraction. Have the children trace over the dotted + and the dotted 1. Ask how many whales there are altogether and have the children complete the addition sentence.

In the exercise at the top right the two fish are leaving the "bubble" and are facing away from the three fish. So we interpret this to mean that the two fish are going away. Ask whether we need an addition sentence or a subtraction sentence to tell what is happening. Ask how many fish there were altogether and how many fish are going away. Have the children trace over the dotted - and the dotted 2. Ask how many fish are left and have the children complete the subtraction sentence. Let the children continue on their own.

For the subtractive situations, you may wish to have the children mark X's to indicate the creatures that are going away.



$$4 + 3 = 7$$

$$6 + 2 = 8$$

$$2 + 3 = 5$$

$$8 - 3 = 5$$

$$9 - 4 = 5$$

$$3 + 5 = 8$$

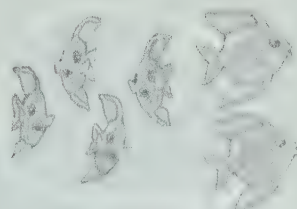
$$6 - 4 = 2$$

$$7 + 0 = 7$$

$$3 - 1 = 2$$

$$1 + 3 = 4$$

$$9 - 3 = 6$$



$$6 - 2 = 4$$

$$4 - 3 = 1$$

$$8 + 1 = 9$$

$$4 + 4 = 8$$

$$7 - 2 = 5$$

$$5 + 3 = 8$$

$$9 - 8 = 1$$

$$1 + 8 = 9$$

$$3 - 3 = 0$$

$$3 + 3 = 6$$

$$8 - 6 = 2$$

Write the correct sign for each number sentence



Writing + or - in number sentences

(one hundred nineteen) 119

LESSON OUTCOME

Decide whether + or - is needed to complete a number sentence

Materials

display board and cutouts

Background

By now the children should be beginning to have a feeling for the relationships between numbers. Given the three numbers for an addition sentence or a subtraction sentence, they should be able to determine whether two of the numbers are related by addition or by subtraction.

RELATED ACTIVITIES

Prepare a work sheet as shown and distribute a copy to each child. Have the children match an addition phrase and a subtraction phrase to each of the numbers from 1 to 9.

2 + 2	1	8 - 7
6 + 2	2	6 - 2
0 + 1	3	9 - 4
2 + 7	4	7 - 4
2 + 0	5	8 - 6
4 + 3	6	9 - 0
3 + 0	7	9 - 3
1 + 5	8	8 - 0
2 + 3	9	8 - 1

LESSON ACTIVITY

Before Using the Page

- Display a set of two cutouts and join another set of three cutouts to it. Ask one child to tell what happened and whether an addition sentence or a subtraction sentence describes the action. Ask another child to state the addition sentence ($2 + 3 = 5$). Have one child remove two objects from the set and explain the action. Ask another child to state the subtraction sentence ($5 - 2 = 3$). Repeat several times.
- Write $2 \bigcirc 1 = 3$ on the chalkboard. Point out that a + or a - is needed to complete the number sentence. Ask the children whether they think the number sentence is an addition or a subtraction sentence and to give their reasons. Repeat with other incomplete addition and subtraction sentences. Make sure the reason for using either + or - is stated each time.

Using the Page

- Discuss the first exercise with the children. Ask how many blue fish there are in the set. Ask whether the three blue fish are coming to join the others or whether they are going away.

Ask whether a + or a - is needed in the number sentence to describe the situation. Have the children trace over the dotted +. Ask a child to read the addition sentence.

For the exercise at the right, ask whether the two fish are coming to join the others or whether they are going away. Ask whether a + or a - is needed in the number sentence to describe the situation. Ask how many fish there were in the set before the two went away and how many fish are left. Have the children trace over the dotted -. Then let the children work independently.

Children may find it helpful to consider each exercise in a way similar to the following:

"There were 6 fish at first. There were 8 fish at the end. Because 8 is greater than 6, some fish must have joined the group of 6 fish. An addition sentence will show this. So I must use a + to complete the sentence."

"There were 4 fish at first. There was 1 fish at the end. Because 1 is less than 4, some fish must have left the group of 4 fish. A subtraction sentence will show this. So I must use a - to complete the sentence."

OBJECTIVE

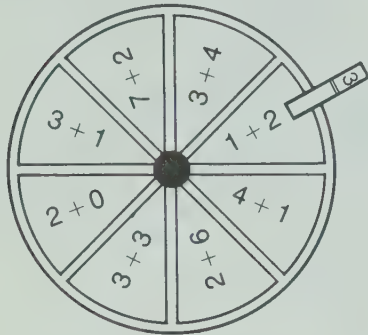
Recall basic addition facts for sums to 9

Materials

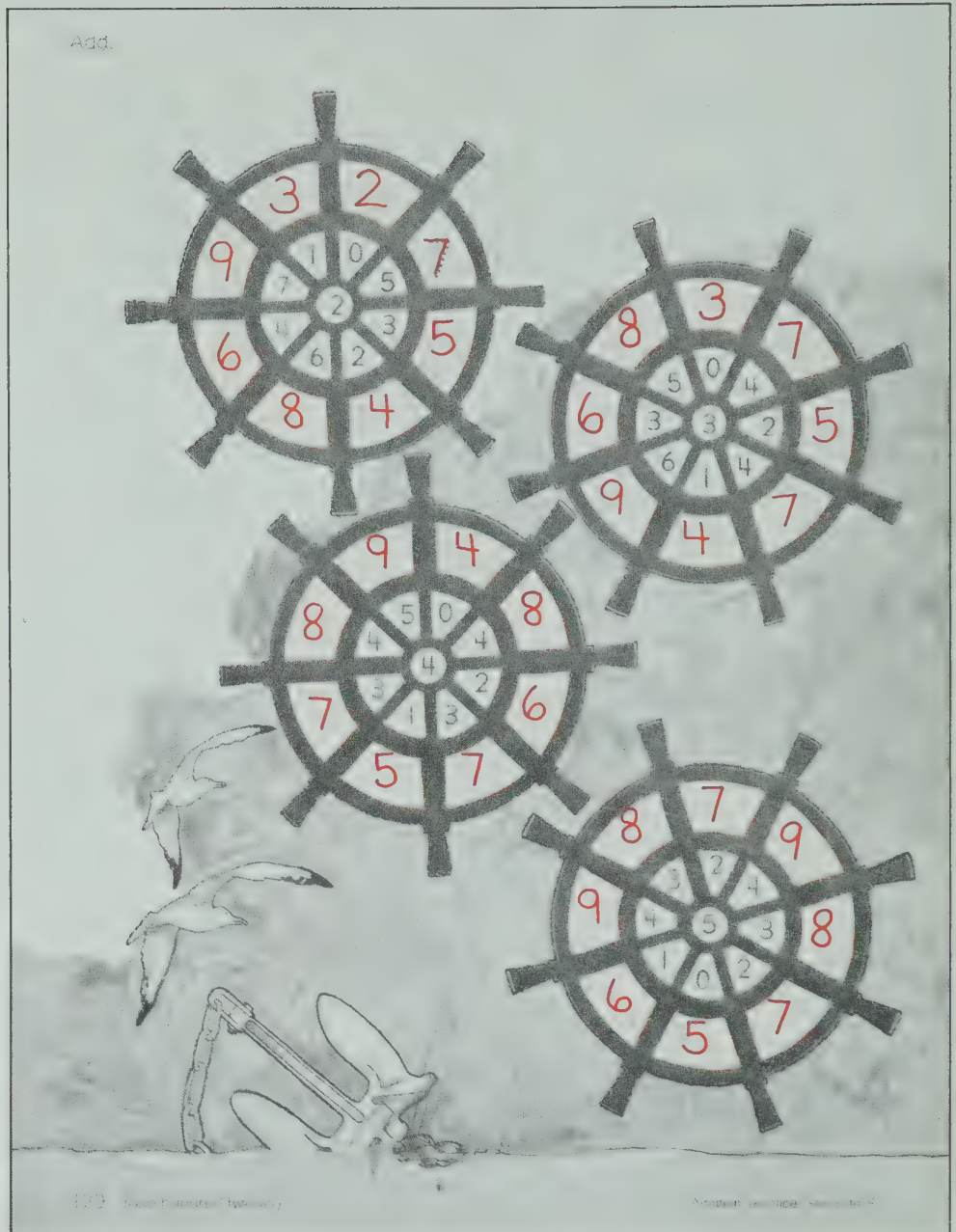
number concept cards for each child

RELATED ACTIVITIES

- Cut circular shapes from cardboard and mark them to look like wheels as shown. Using clothes pins with the numerals printed on them, have the children pin the appropriate answer to each section of the wheel.



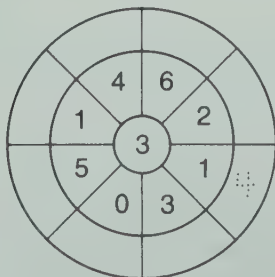
- One of the activities suggested on page T120 in Unit 5 was the use of a chart for showing all the addition facts having sums to 9. If the chart was not used at that time, introduce it now and have the children complete the chart as described on page T163.



LESSON ACTIVITY

Before Using the Page

- Draw a number wheel on the chalkboard as shown.



Explain that each number around the 3 is to be added to it, and that the sums are to be written as indicated. Point to the 3 and the 1 and say, "What number does three plus one equal?" Have the children hold up the appropriate number concept card for the answer (4). Have a child print the answer on the number wheel. Continue until the number wheel is completed.

Eraser the answers and substitute 2 for the 3 at the centre of the number wheel. Complete the number wheel as before.

Using the Page

- Have the children complete the number wheels by recording the sums in the appropriate spaces in the same way as in the preliminary activities. When the children have completed the four number wheels, you may wish to have them state the addition sentences for each number wheel.

OBJECTIVE

Recall basic subtraction facts for minuends to 9

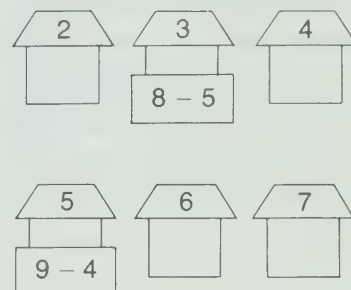
Materials

number concept cards for each child

RELATED ACTIVITIES

- Adapt the activity involving wheels suggested on page T156 for subtraction facts.
- Play the game "Mail Delivery". Display six paper houses. Assign a number from 2 to 7 to each house. Give each child a card on which there is a subtraction phrase that names a number from 2 to 7. Have the children deliver their "letters" to the appropriate houses; that is, the cards showing the subtraction phrases are placed in front of the houses.

As a variation, you may wish to fasten subtraction phrases to the houses and have children deliver "answer" letters to the appropriate houses.

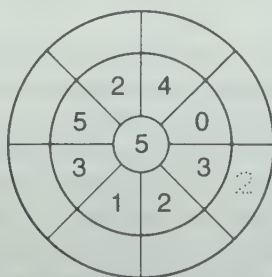


Subtraction practice: minuends to 9

(one hundred twenty-one) 121

LESSON ACTIVITY**Before Using the Page**

- As for page 120, draw a number wheel on the chalkboard as shown.



Explain that each number around the 5 is to be subtracted from it, and that the answers are to be written as indicated. Point to the 5 and the 3 and say, "What number does five minus three equal?" Have the children hold up the appropriate number concept card for the answer (2). Have a child print the answer on the number wheel. Continue until the number wheel is completed.

Erase the answers and substitute 6 for the 5 at the centre of the number wheel. Complete the number wheel as before.

Using the Page

- Have the children complete the number wheels by recording their answers in the appropriate spaces in the same way as in the preliminary activities. When the children have completed the four number wheels, you may wish to have them state the subtraction sentences for each number wheel.

LESSON OUTCOME

Complete addition and subtraction sentences for sums and minuends to 9

Vocabulary

code

RELATED ACTIVITIES

• For children who are able, you may wish to prepare a list of coded number sentences some of which are incorrect. Have them decode the sentences and mark the ones that are incorrect. If you wish to have the children correct the ones that are incorrect, there will be more than one possible way. For example, $2 + 1 = 5$ may be written correctly as $4 + 1 = 5$, or $2 + 3 = 5$, or $2 + 1 = 3$.

• Have the children make up a code using colored dots for the numerals from 0 to 9. A possible code might be 0 (white), 1 (red), 2 (blue), 3 (yellow), 4 (green), 5 (orange), 6 (brown), 7 (purple), 8 (black), 9 (pink). The children can make up exercises for one another to complete.

(blue) + (orange) = (purple)

(brown) - (red) = (orange)

Children may enjoy making their own codes. One child made the following code.

○ (0) □ (1) × (2) △ (3) □ (4)

▢ (5) ◊ (6) ≠ (7) ⊠ (8) ⊕ (9)

LESSON ACTIVITY

Before Using the Page

• Print the nine letters and numerals on the chalkboard as shown.

A	B	C	D	E	F	G	H	I
1	2	3	4	5	6	7	8	9

Ask the children if they know what a code is and why codes are used. Write 8945 on the chalkboard. Discuss how a number can be associated with a letter to make a code. Have children translate 8945 into HIDE. Code words that they know and have them discover what the words are, for example, 297 is BIG, 214 is BAD, 8514 is HEAD.

• Write the number sentence $2 + 3 = 5$ on the chalkboard. Ask what letter can be written for 2, for 3, and for 5. Ask a child to write the coded number sentence $B + C = E$ on the chalkboard. Write other number sentences and have the children code them.

Complete.



$$C + D = G$$

$$3 + 4 = 7$$

$$A + C = D$$

$$1 + 3 = 4$$

$$B + B = D$$

$$2 + 2 = 4$$

$$C + B = E$$

$$3 + 2 = 5$$

$$D + B = F$$

$$4 + 2 = 6$$

$$D + E = I$$

$$4 + 5 = 9$$

$$C - A = B$$

$$3 - 1 = 2$$

$$I - E = D$$

$$9 - 5 = 4$$

$$F - C = C$$

$$6 - 3 = 3$$

$$H - C = E$$

$$8 - 3 = 5$$

$$G - E = B$$

$$7 - 5 = 2$$

$$E - C = B$$

$$5 - 3 = 2$$

122 (one hundred twenty-two)

Addition and subtraction practice: sums and minuends to 9

Write the coded sentence $D + B = F$ on the chalkboard. Ask what numbers D, B, and F represent. Ask a child to write the number sentence on the chalkboard. Have the children decode other number sentences.

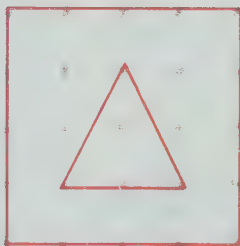
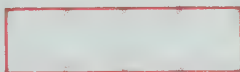
Using the Page

• Point out the code to the children. They should note that it is the same as the code used in the preliminary activities. Review what number each letter represents. Direct their attention to the coded sentence $C + D = G$. Ask what number C represents, what number D represents, and what number G represents. Have the children trace over the dotted 3, 4, and 7.

Direct the children's attention to the coded sentence $H - C = E$. Ask whether it is an addition sentence or a subtraction sentence. Ask what number H represents, what number C represents, and what number E represents. Have the children complete the subtraction sentence. Ask them to check that three subtracted from eight is five.

Have the children decode the remaining number sentences, checking that the addition or subtraction fact is stated correctly.

Answers will vary.



Making shapes on a geoboard

(one hundred twenty-three) 123

Page 123

LESSON OUTCOME

Follow instructions for making shapes on a geoboard

Materials

geoboards, rubber bands, copies of page T332, flash cards having triangular, square, and rectangular shapes

RELATED ACTIVITIES

- Have the children work with geoboards or copies of page T332. Let the children challenge each other in giving instructions and making shapes. Encourage them to use both number and shape as in the following:
 1. Make a triangle that has one peg inside it.
 2. Make a square that has one peg inside it.
 3. Can you make a square having two pegs inside it?
 4. Can you make a rectangle having two pegs inside it?
 5. Can you make a square having three pegs inside it?
 6. How many pegs are inside the largest square you can make?
 7. Make the largest rectangle you can that has no pegs inside it.

LESSON ACTIVITY

Before Using the Page

- Work with the children in groups according to the number of geoboards you have. If you have no geoboards, make copies of page T332.

Have available three flash cards, one a triangular shape, one a square shape, and one a rectangular shape. Hold up each shape in turn and ask questions about the name of the shape and the number of sides and the number of corners it has.

Hold up a triangular shape and have the children make that shape on their geoboards. When all the children have made the shape, have them hold up their geoboards so that you can check their work at a glance. Repeat the procedure by having them make a square and then a rectangle. You may wish to have them make small shapes and then large shapes.

Depending upon the ability of the group, you may wish to challenge the children by having them make, for example, a large shape and then a smaller shape inside the larger shape.

All the children should experience these preliminary activities before you assign the page.

Using the Page

- If you have a geoboard for all the children in the group, tell them that they are to make a given shape on the geoboard and then copy the shape onto a geoboard on the page. If you do not have geoboards, you may wish to have the children work on copies of page T332 first and then copy their diagrams onto the page.

Have the children listen carefully to the instruction for making the appropriate shape on each coded geoboard.

1. Make the largest square you can.
2. Make the smallest square you can.
3. Make the smallest triangle you can.
4. Make the longest rectangle you can.
5. Make a triangle that has five pegs on one side.
6. Make a triangle inside a square.

LESSON OUTCOME

Complete basic addition and subtraction facts for sums and minuends to 9

Materials

counters for each child

RELATED ACTIVITIES

- Play the game "Numbers and Sums" as described on page T325.
- Children enjoy making their own rules for games. Prepare a work sheet as shown below and guide the children in making rules for a game. They will also enjoy choosing a name for the game.

$8 - 6$	$8 + 0$	$3 + 5$
$6 + 2$	$5 - 4$	$8 - 5$
$9 - 6$	$9 - 5$	$6 - 0$
$5 + 2$	$2 + 7$	$7 + 2$
$7 - 6$	$3 + 3$	$6 + 3$
$4 - 2$	$3 + 1$	$5 + 4$
$6 - 5$	$1 + 7$	$3 + 2$
$9 - 3$	$8 - 2$	$3 - 3$

You may wish to have the children color inside the rectangles according to a particular code similar to the one suggested in *Related Activities* on page T158.

Try these.

Now try these.

124 (one hundred twenty-four)
Addition and subtraction practice: sums and minuends to 9

LESSON ACTIVITY

Before Using the Page

- This is a page for reviewing basic addition and subtraction facts. You may wish to use the page for testing to determine which children are having difficulty with addition and/or subtraction facts. If abstract testing is too difficult for the children, or for some of them, they may use counters. In any case, their responses to the symbols + and - will indicate whether difficulties were encountered.

Before assigning the page, review addition and subtraction facts by having the children participate in some of their favorite activities and games from previous lessons involving addition and subtraction facts.

Using the Page

- Assign the exercises that you wish the children to complete. Tell them to note the symbols + and - so that they will know whether to add or subtract the two numbers.

You may wish to prepare answer sheets for this page so that the children can check their own work.

OBJECTIVE

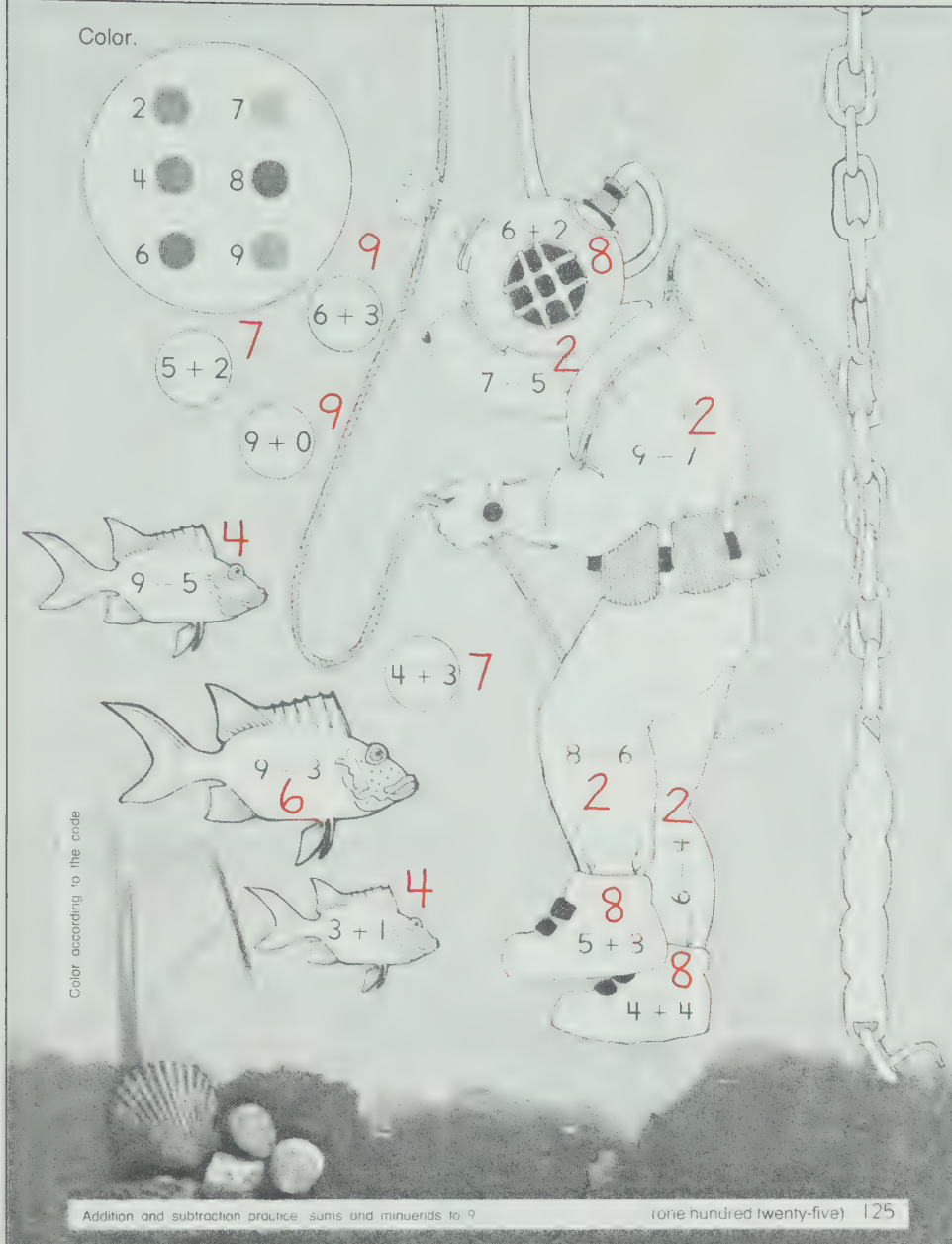
Recall basic addition and subtraction facts for sums and minuends to 9

Materials

crayons for each child

RELATED ACTIVITIES

- Use pictures from magazines to make puzzles for the children to complete.
 - 1. Paste each picture on a piece of cardboard.
 - 2. Cut the picture into about nine pieces having different shapes.
 - 3. Place the pieces together in their correct positions and trace around each piece on a sheet of paper the same size as the picture.
 - 4. On the back of each piece of the puzzle write an addition phrase or a subtraction phrase. Record the sum or the difference in the corresponding space on the sheet of paper.
- Have children place the pieces of a puzzle on the sheet of paper by matching the phrase on the back of each piece with the appropriate sum or difference on the paper. (See page T163.)
- Have the children review addition and subtraction facts in the way described on page T325.



LESSON ACTIVITY

Before Using the Page

- Review addition and subtraction facts by playing a game that the children enjoy; for example, adapt the game "Numbers and Sums" described on page T325 for both addition and subtraction facts.

Using the Page

- Discuss the colors and their names with the children. Ask which color is associated with each of the numerals 2, 4, 6, 7, 8, and 9. Have the children look at the picture and locate things that are to be colored green, blue, red, and so on.

Have the children print the answer lightly beside each addition or subtraction phrase before they start to color. This will make the activity easier for those children who need to use counters.

OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

Materials

counters for each child, two sets of numeral cards for 0 to 9, a card for each of the symbols +, -, and =

RELATED ACTIVITIES

- Give each child a four-by-four section of squared paper cut from copies of page T342 and marked as shown below. Ask the following questions and have the children write their answers in the squares.

- A "How many eyes do you have?"
- B "How many fingers are there on one hand?"
- C "How many wheels are there on a tricycle?"
- D "How many legs are there on a table?"

Have the children find the sum of the numbers in each row by adding in opposite directions, and then find the sum of the numbers in each column by adding in opposite directions. Finally, have them find the sum of the numbers in each diagonal by adding in opposite directions.

	A 2	B 5	
	C 3	D 4	

	5		8
7	2	5	7
	C 3	D 4	
8	5		

Complete.

$$4 + 1 = 5$$

$$2 + 2 = 4$$

$$2 + 6 = 8$$

$$3 + 4 = 7$$

$$2 + 0 = 2$$

$$5 + 3 = 8$$

$$3 + 3 = 6$$

$$7 + 2 = 9$$

$$5 + 4 = 9$$

$$2 + 5 = 7$$

$$5 - 2 = 3$$

$$6 - 4 = 2$$

$$9 - 4 = 5$$

$$5 - 0 = 5$$

$$3 - 2 = 1$$

$$5 - 4 = 1$$

$$4 - 4 = 0$$

$$8 - 7 = 1$$

$$8 - 2 = 6$$

$$9 - 3 = 6$$

Print + or -

$$1 \oplus 3 = 4$$

$$7 \ominus 3 = 4$$

$$2 \oplus 7 = 9$$

$$8 \ominus 5 = 3$$

I have



I buy



I have 2 ¢ left.

126 (one hundred twenty-six)

Add.

$$\begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 2 \\ + 4 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 3 \\ + 5 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 3 \\ + 2 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 5 \\ + 4 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 3 \\ + 6 \\ \hline 9 \end{array}$$

Subtract.

$$\begin{array}{r} 8 \\ - 3 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 8 \\ - 4 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 7 \\ - 5 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 6 \\ - 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 7 \\ - 2 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 9 \\ - 3 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 4 \\ - 2 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 6 \\ - 3 \\ \hline 3 \end{array}$$

CHECKUP

LESSON ACTIVITY

Before Using the Page

- Place two sets of numeral cards for 0 to 9 and a card for each of the symbols +, -, and = face up on a table. Ask a child to select two cards and display them on the chalkboard ledge. Depending on the numbers shown, place the card for + or the card for - between the two numeral cards, and place the card for = to the right of the second numeral card.

$$4 + 3 =$$

Ask the children to complete the number sentence, using their counters if necessary. Have one child select the appropriate numeral card to complete the sentence and have another child write the complete sentence on the chalkboard. Repeat for several other pairs of numbers.

Vary the activity by selecting a card yourself for a sum or a difference and having the children decide whether the card for + or for - should be used to complete the sentence.

$$6 - 2 = 4$$

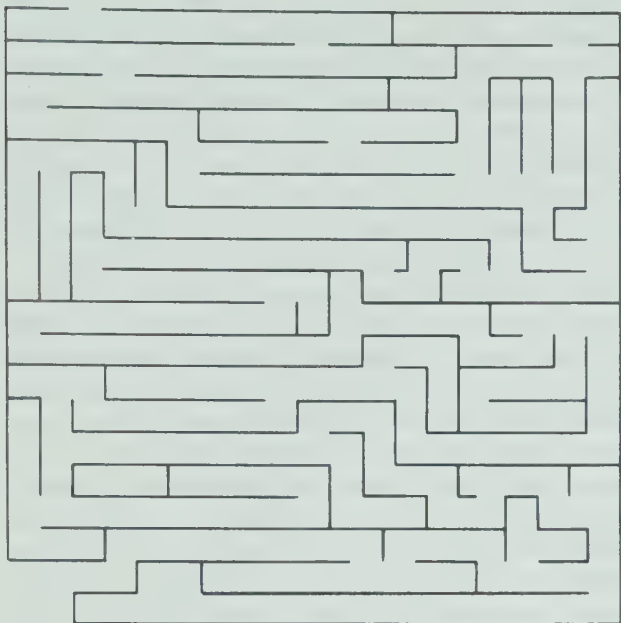
- Use a nickel and four pennies to display amounts of money to 9 cents. Have children state the amounts shown. Ask them to determine how much they would have left if they bought an item costing 1 cent (or other amounts to 9 cents).

Using the Page

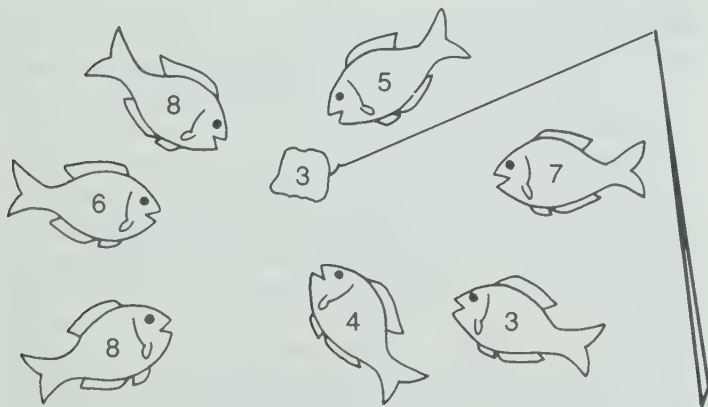
- Review the purpose of a *Checkup* with the children. Point out the different groups of exercises on the page and discuss what is required for each group. You may wish to have the children complete the five exercises at the bottom of the page first under your guidance. Then have the children work independently to complete the remaining exercises.

Games and Activities

Maze for page 107



How Many Fish Can You Catch? (Game for page 111)



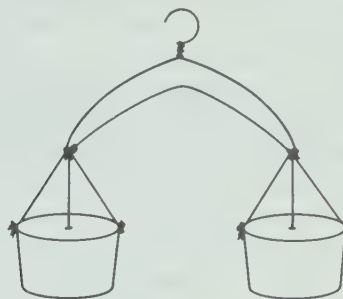
Matchmates (Game for page 113)

Prepare a set of cards showing subtraction exercises in vertical form and a set of answer cards. Shuffle the first set of cards and place them face down in a pile. Display the answer cards face up in separate piles for 0, 1, 2, . . . , 9. Divide the class into two teams. One player from each team draws a subtraction card, selects the appropriate answer card, and states the corresponding subtraction sentence. A correct response earns a point for the team.

Children may play this game in small groups. In this case, all the cards are shuffled and placed face down in an array. (You may prefer to have the subtraction cards and the answer cards arranged in separate arrays.) Players take turns turning over two of the cards. If the cards match (a subtraction card and the appropriate answer card), the player keeps the cards and takes another turn. If the cards do not match, they are turned face down again and the next player has a turn. At the end of the game the player with the most cards is the winner.

Balance Scales (for page 115)

A wire coat hanger hanging freely from a hook may be used as balance scales. Use three strings to attach a plastic container from cottage cheese, for example, to each end of the coat hanger. The children may compare masses by putting an object in each of the containers.



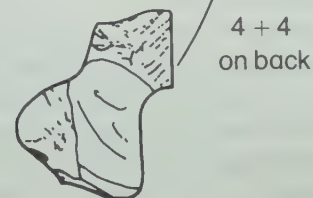
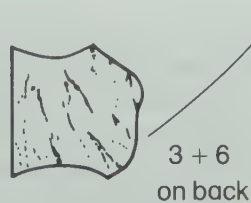
Activity for page 120

After the children have recorded the sums, have them color lightly over the numerals in the squares, using different colors so that all the 9's are in one color, all the 8's in another color, and so on. Note that the children will need ten different colors.

If the chart was used in Unit 5, it may be altered to provide further addition practice. Arrange the addends at random as shown below. In this form, however, the chart does not display the diagonal number patterns.

+	4	0	1	3	5	2
0						
3						
5						
2						
1						
4						

Puzzle for page 125



Unit 7 Overview

The major topic in this unit is the number ten, which is the base of our system of numeration. Recognition of the word *ten* and the numeral 10 is included, but place value is not mentioned at this time. Number combinations for ten lead to addition and subtraction facts having sums and minuends of 10, and these are presented in number sentences and in vertical form. Ordering of numbers is extended to include 10. The numbers ten to ninety and their numerals, 10 to 90, are identified as numbers of tens. Counting by tens is presented through the introduction of the dime and its value of 10 cents. Simple word problems involving the comparative use of subtraction are solved using one-to-one matching of members to find the differences. Geoboards are used to provide practice in reproducing geometric shapes. Patterns composed of shapes lead children to continue such patterns and to write related number patterns. The *Checkup* assesses number facts and skills presented in this unit and in previous units, as well as simple word problems and number patterns.

Unit Outcomes

Number

- identify and record the number of a set having from seven to ten members
- recognize and print the numeral 10
- recognize the word *ten*
- identify number combinations for ten
- order the numbers from 0 to 10
- complete subtraction sentences for minuends of 10
- complete addition and subtraction sentences for sums and minuends to 10
- recognize subtractive situations and write the corresponding subtraction sentences
- use one-to-one matching to find how many more there are in one set than in another
- write subtraction sentences for comparison situations and find *how many more* and *how many fewer*
- identify and represent sets of tens from 1 ten to 9 tens
- write the numerals for tens from 10 to 90

Measurement

- recognize a dime and know that it is equivalent to ten pennies and its value is 10 cents
- use amounts of money to 10 cents in additive and subtractive situations
- use dimes to reinforce counting by tens to 90

Geometry

- copy geometric shapes onto a geoboard or geopaper
- continue the pattern of a sequence involving sets of objects and write the corresponding numbers

Background

Number: In the previous units the children's experiences with numbers have involved only those of one digit. Now zero is met in conjunction with another digit when the children are introduced to two-place numerals beginning with 10 and extending to 20, 30, 40, . . . , 90. For these, the children experience grouping objects together into sets of ten and so become

familiar with the base of our system of numeration. It is almost certain that ten became the base because the ten fingers were the first calculating mechanism.

It is important that children become thoroughly familiar with the number ten, and later with the powers of ten, so that they can read and write numerals with understanding. Most children are able to recognize the numeral 10 before they enter school because it is found so frequently in everyday life. For this reason, there is no specific reference to place value in this unit. The concept that 4 and 0, for example, serve as place holders as well as numbers in the numeral 40 is left for development in Units 8 and 9 where two-place numerals are studied in detail.

In Unit 1 the children used one-to-one matching for determining which of two sets had more or fewer members. It was not necessary to count the members in each set. In this unit the process of matching is reviewed and extended to include the ideas of *how many more* and *how many fewer*. Without knowing the actual number of members in each of the two sets, *how many more* can be established by matching members of the two sets one to one and then counting the unmatched members. By carrying out these steps at the concrete level, children are introduced to a second interpretation of subtraction. (The first one was the "take-away" approach introduced in Unit 5.) At the abstract level, children will be comparing two numbers by subtracting one number from the other. The result is called the *difference* of the two numbers. At this stage some children may wish to use the idea of "counting on" to find the difference of the two numbers.

Measurement: The decimal nature of our monetary system provides many opportunities to develop understanding and apply skills in using the standard numerals of our base-ten system of numeration. Introduction of the *dime* in this unit strengthens the development of the number concept ten and its numeral, 10. Many children will probably know that a dime is worth 10 cents, but they may never have actually exchanged 10 pennies for one dime. By counting stacks of ten pennies and sets of dimes, the children are introduced to the process of counting by tens. With practice in reading and writing the numerals for 10, 20, 30, . . . , 90, children may be able to see that the digit to the left of the zero indicates the number of tens, and place value does not need to be introduced at this time. Children may see that the number of dimes required for an amount is shown in the numeral; for example, 4 dimes is equivalent to 40 cents. From this, they can generalize that 40 means 4 tens and apply this understanding to the interpretation of other tens.

Geometry: Pattern has been called the underlying theme of mathematics. The ability to recognize and use patterns is a valuable problem-solving device. In this unit the children are asked to identify and then continue patterns based on geometric shapes, and these in turn are translated into patterns involving numbers. In the *Related Activities* the children are given an opportunity to create their own designs and patterns. By looking for patterns in many different forms, children may acquire a broader picture of the existence of patterns in the everyday world.

Activities on the geoboard help to reinforce properties of two-dimensional shapes and at the same time provide an incidental review of such terms as *larger than*, *smaller than*, *the same size as*, *inside*, *outside*, *above*, *below*.

Teaching Strategies

The first twelve pages of this unit deal with the number concept ten, addition and subtraction facts, and the use of subtraction in comparing numbers. For these topics the composition and size of instructional groups can be the same as those used for Unit 6. Children will be using their number concept cards, number charts, and the number trays, which will be extended to include the number ten. Children may be regrouped for the remaining lessons of the unit, which deal with the dime, sets of tens, counting with dimes, patterns, and geoboards.

Besides covering the work outlined for this unit, regular review and practice of earlier concepts, understandings, and skills should be incorporated into the program. Consolidation of learning is essential for it to be retained and applied in new situations. The topics to include in these reviews are recognition of sets without counting (up to about five members), recognition of number names and numerals, counting, ordering numbers, and comparing numbers by matching the members of two sets. Basic addition and subtraction facts should be reviewed and, if necessary, rediscovered. Children can be helped to achieve mastery of basic addition and subtraction facts by learning them in pairs; for example, $4 + 3 = 7$ and $3 + 4 = 7$, and $7 - 3 = 4$ and $7 - 4 = 3$. Organizing facts by their sums and minuends can also help children to gain mastery of the facts and give a real sense of achievement as each set is completed successfully.

Short timed tests may be given for addition and subtraction facts with sums and minuends to 10. Exercises may be given on the chalkboard, on work sheets, or orally. Because time is important in establishing whether the facts are really known, the children should write only the answers. Although work sheets and chalkboard exercises provide a visual record of the known and unknown facts, these may allow some children to linger over items they do not know. This difficulty can be overcome by reading the items while the children look at them, thereby setting a pace for the responses. Oral testing alone does set a pace but does not provide a visual record for analysis.

Some preparatory work for the next unit may begin at this time. In Unit 8 the children will begin working with two-place numerals and will be counting groups of tens and ones. In anticipation of this topic, you may begin now with counting activities that motivate a need for grouping.

Divide the class into small groups and provide each group with a box of items to be counted (fewer than 100). Give the children in each group time to consider how they will approach this task and observe what they do. They may begin by counting by ones as far as they can and possibly encounter some difficulty. This may lead to the idea of grouping objects into sets of 5 or 10, for example.

The notion of grouping may be sparked indirectly by simply providing children with several small paper cups to help them in counting items. A group of children working with beads may be offered pipe cleaners with a knot tied at one end of each to prevent beads from falling off. Children themselves may ask questions that reveal the idea of grouping. For example, children counting individual Unifix cubes may ask if it is permissible to snap some of them together. The more occasions children have for counting things, the greater the chance that the concept of grouping will arise naturally. Varying the mate-

rials to be counted encourages flexible thinking in children. The number of objects in the boxes should also be changed from time to time. Help the children record the results of their counting; for example, "We counted the beads. We put 10 on each pipe cleaner. We had 7 tens and 4 more."

Materials

display board and cutouts
flash cards showing from zero to ten objects
overhead projector and transparencies of sets of objects (optional)
an index card for each child to make a number concept card for *ten*
blocks, items suitable for making sets, devices for set holders
flash card for the word *ten*
cards for the numerals 0 to 10, flash cards for the words *zero* to *ten*
elevator beads for each child
number trays for *one* to *ten*
ten counters, yarn or string for each child
Unifix cubes, gummed shapes, graph paper
crayons for each child
a spinner for choosing numbers, markers and dice for games
flash cards for subtraction phrases from $10 - 0$ to $10 - 10$
number concept cards for 0 to 10 for each child
real money, play money, coin cutouts from copies of page T337
flash card for the word *dime*
items with tags showing prices from 1¢ to 9¢, others from 10¢ to 90¢
geoboards, colored rubber bands, copies of page T332 or T333
transparent geoboard and overhead projector (optional)
straws, stirrers, or objects suitable for grouping in tens
beans or large seeds, plastic bags, twist ties
attribute blocks, or suitable substitute, for making patterns
demonstration number strips, number strips prepared from copies of page T341 for each child
flash cards for addition and subtraction facts having sums and minuends to 10

Vocabulary

digits	seventy
ten	eighty
tens	ninety
twenty	how many more
thirty	how much
forty	dime
fifty	spent
sixty	bought

Unit 7 Theme – At School

The purpose of this theme is to make the children aware of different aspects of the school, for example, the building and the grounds, the various types of employees, the purpose of a school. If the children explore the building, talk to the people who perform different tasks, and visit other classes, they should gain confidence in and an appreciation for their educational experience.

Set aside a space for a school display that will grow as the children collect photographs and complete their charts, maps, and pictures.

LANGUAGE ACTIVITIES

1. Interviewing People

Plan a series of periods in which the children can interview various people who work in a school, such as the principal, secretary, caretaker, nurse, and dentist. Before the interview, discuss with the children what they already know about the particular role of the person to be interviewed. Record on a chart the things they wish to find out. Have individual children read these questions at the interview. Encourage the children to interact with the person being interviewed. This experience can be an extremely rewarding one for the children in developing listening skills and oral language.

As the children gather information about the different jobs performed in a school, encourage various role-playing situations.

2. Recording Information

After each interview of the various people who work in the school, have the children recall the answers to the questions that were listed on the chart. Have the children record things about the person who was interviewed. These pages would be suitable for a book entitled “People Who Work in Our School”.

3. Writing Stories

As the children review the answers to the questions asked in each interview of the various people who work in the school, develop a story and record it on chart paper. Have the story read by the whole class and by individual children. Place these charts in the school display where the children can read them in their spare time. The children will also be able to refer to them for words they may need in the activities that follow.

4. Learning from Others

Explain to the children that one learns through everything one does. When we think of places for learning, we usually think of school first. Ask the children to suggest other places where we learn things. Record on a chart the places that they name. Ask the children to name people from whom we learn things. List the suggestions as the children think of them. Finally, ask the children to help you list things we learn to do.

5. Being Teacher

Ask the children what things they would have to do if they were the teacher. If possible, have the children help to perform some of the tasks usually performed by the teacher, such as printing the date on the board or changing the date on the

calendar, choosing other children to distribute or collect materials, and leading the class in a song.

6. School Helpers

Arrange for children to be helpers for different people who work in the school (principal, caretaker, cafeteria workers, librarian, other teachers). When the children return to the classroom, ask them to describe their experiences to their classmates. Some children may wish to write about their experiences; others may wish to draw pictures.

MATHEMATICS ACTIVITIES

1. Classifying School Materials

Cover a cardboard carton with brightly colored paper. Have the children suggest typical school materials to be placed in the box, for example, assorted pencils, pens, crayons, markers, pastels, chalks, paintbrushes, scissors, glue, paper, books.

Have the children suggest various ways of sorting the materials. List the ways on activity cards. Some of the classifications suggested may be as follows:

- a. things we write with
- b. things we make pictures with
- c. things the teacher uses
- d. things children use
- e. things that are hard
- f. things that have to be sharpened
- g. things that will break
- h. things that can be poured
- i. things that are made of metal

Number each activity card. Have the children record on their papers the numbers of the activity cards they choose and then trace around each item that belongs to a particular classification.

2. Measuring with Non-Standard Units

Have the children select items from the box for Mathematics Activity 1 to use as non-standard units of length. Have each child record the measurements of at least three items in the classroom. The items measured should be of various lengths or heights, for example, the length of the chalkboard, the height of a desk. The sheets of paper on which the children record their findings can be made into a book entitled “Classroom Measurements”.

3. Picturing the Classroom

Have the children name the standard items of furniture in the classroom, for example, child’s desk, teacher’s desk, work table, round table, sand table, storage unit. List the items on a chart and discuss the shapes.

Have the children use gummed shapes to make a picture of the arrangement of the furniture. Include this picture in the school display.

This picture can be used to develop the children’s ability to interpret plans. When the children are not watching, hide one or two objects in the classroom. Mark each hiding place on the picture with an X. Ask the children to find the objects according to the locations indicated on the “map”.

4. Graphing

Have the children decide which five items from the box for Mathematics Activity 1 they use most often in their daily work. Place the five items in a row on a large sheet of newsprint and trace around each item. Have the children compare the items by asking them such questions as:

- “Which item is the largest?”
- “Which item is the smallest?”
- “Which item has the oddest shape?”
- “Which items are long and thin?”

5. Missing Persons

Have the children pretend that one of their classmates has been missing for several days. Ask each child to draw a picture and give a description of the missing friend. The information should include her/his height, mass, age, color of hair and eyes, any distinguishing marks on the face or hands, a description of the clothes the friend was wearing when last “seen”, and any other information that would be helpful for locating the missing friend.

It would be preferable to list on a chart the headings for the information required so that the children could refer to it when describing the missing friend.

After the lists are completed, have each child in turn read her/his description of the missing friend to see whether the other children can recognize which classmate has been described.

6. A Bake Sale

Preparing for a sale provides experiences in working together, organization, vocabulary building, measuring, and handling of money. Help the children decide on what they will bake to sell to other classes in the school or to other people in the neighborhood.

Before the sale discuss with the children how they would like to use the money collected from the sale; for example, donate it to a charitable organization or spend it on things for the classroom (books, records, plants, an aquarium).

SCIENCE ACTIVITIES

1. Building Materials

Explore with the children the various materials used in building the school. Collect samples of each material and discuss its properties with the children. If possible, perform various simple experiments with each.

Some of the properties of each material are listed below.

Concrete Blocks

These are used for foundations and walls.

They are man-made from cement (lime and clay), sand, gravel, and water.

They are strong and durable but will chip and break.

They will absorb water.

They will not burn.

Bricks

These are used for outer walls and sometimes for interior walls.

They are man-made from clay fired at a high temperature.

They are lighter than concrete blocks but will chip and break.

They will absorb water.

They will not burn.

Steel

This is used for the superstructure of a building.

It is a man-made alloy of iron and carbon.

It can be tempered for hardness.

It is heavier than bricks or concrete blocks.

It will rust when exposed to water.

Wood

It may be used for the frame and walls of a building.

It is used for doors, windows, and panelling.

It is a natural material sawed from logs.

It can be scratched and marked easily.

It is lighter than steel.

It will absorb water.

It will burn.

Glass

It is used in windows and doors.

It is a man-made material of sand and soda or potash.

It is hard and brittle, breaking according to thickness.

It is usually transparent.

It will not absorb water.

It will not burn.

2. Heating, Plumbing, and Lighting Systems

Ask the caretaker for assistance in showing the children these systems. If possible, tour the boiler room. Have the children find out what fuel is used, how it is burned, and how the heat is forced through pipes to all parts of the school.

Water comes from a main supply outside the school and travels through pipes to the various fixtures. Waste water is carried off in pipes to a central sewage plant.

Hydroelectric power also comes from a main supply and travels through wires. The lights are controlled by switches that allow the electric current through to provide illumination. Emphasize how the lights should be turned off to stop the electric current when illumination is not needed. Hydroelectric power is also required to make other machines operate, such as the record player, the tape recorder, and the television set.

3. A School Greenery

Your classroom is an ideal place to provide the children with an opportunity to grow plants. In school you will be able to show the effects of light, heat, and air on roots, stems, and leaves of plants.

In your classroom you may have space to grow many types of house and garden plants. Each child may enjoy tending a plant of her/his choosing. Encourage the children to do research to learn about the different plants; for example, the conditions under which they grow best, how they can be reproduced (by seeds only or by cuttings from a stem, a leaf, or a root), what they are used for (food, medicines).

4. Waste Prevention

Discuss how your class could reduce the amount of waste materials in the classroom by making maximum use of paper that they are to cut, paste, and write on.

Also, discuss with the children how they are helping to recycle items by bringing to school such objects as buttons, small containers, scraps of fabric and gift-wrapping paper to be used in activities involving sorting, counting, and measuring.

SOCIAL STUDIES ACTIVITIES

Take the children on tours of various parts of the school so that they will be acquainted with the layout of the building. After each tour discuss with the children the observations they made and the information they obtained. This information is to be used in the following activities.

1. The Classroom

Discuss with the children the shape and the size of the classroom. Draw a plan of the classroom on a large piece of paper. Have the children identify the features that are located on the walls and along the sides of the classroom. Indicate the windows, doors, chalkboards, counters, and cupboards on the plan. Discuss the furniture in the classroom and its arrangement. Indicate the positions of the furniture on the plan. Discuss the completed drawing of the classroom. Remove the drawing and have the children produce their own versions of the classroom.

2. The School

Have the children walk along the sides of the school building. Discuss the size and the shape of the building. Count the classrooms in the school. List all the other rooms, such as the library, washrooms, offices, and health room. Draw a plan showing all this information. Have small groups of children draw plans of the rooms that are not classrooms. Mount these plans around the plan of the school.

3. The Playground

Have the children explore the playground area and draw plans that show the hard-surface areas, the sports areas, and the recreation equipment. Discuss the individual plans and then construct a large plan of the playground for the school display.

4. Time Capsule

Discuss the concept of a time capsule with the children. Consider what the contents of a time capsule for your class might be; for example, a map of the neighborhood, a photograph of the school, a photograph of all the members of the class, a photograph of all the teachers and the support staff, a favorite song or record, samples of their art, some poems and stories they have written. Each child may choose to draw a picture of herself / himself complete with name and date.

After the time capsule has been completed and sealed, decide with the children on a date for opening the time capsule. Suitable dates might be at the end of the present school year or the year in which they leave elementary school.

5. Memorable Moments

During the school year, take several rolls of film showing the children engaged in typical school activities; for example, arriving and leaving on the school bus, working on art posters or murals, singing songs and listening to records, dramatizing poems and stories, completing mathematics projects, eating in the school lunchroom, exercising in the gym.

Assemble the pictures in an album and let each child take it home to show her / his parents.

Always have the camera ready to take spur-of-the-moment pictures of memorable moments in the classroom. By the end of the school year you should have an impressive collection that can be displayed at the school-closing activities. Interested parents will probably ask for prints.

ART ACTIVITIES

1. Painting Portraits

Discuss the concept of a portrait with the children. Have them use tempera paint of different colors and large sheets of Manila paper for painting portraits of the people who were interviewed in Language Activity 1. Display these portraits in a prominent place in the school.

2. Word Mural

Cut a piece of mural paper about 2.5 m long. Provide about six bright colors of thick tempera paint. Paint the word *school* in large letters in the centre of the paper. Have each child in turn paint on the mural a word that is brought to mind by the word *school*. The words can be in any color and painted at random on the paper. When all the words are painted, have each child outline her / his word in paint of another color. Have the children continue outlining the words until all the outlines meet and the paper is completely covered with paint. This should be a colorful piece of work for the school display.

MOVEMENT ACTIVITIES

1. Playground Action

Plan to use the playground for your physical education activities for this theme. Have the children choose the activities and suggest suitable attire to make the best use of the space available. This challenge should encourage careful planning by the children as well as strenuous physical activity.

2. Scavenger Hunt

This activity will help the children to become more familiar with their school and where to find things in the school. Be sure to inform the other teachers and school personnel of the day that you plan to hold the "hunt".

Organize the children into teams of five or six members. Prepare in advance a list for each team. Rather than preparing just a list of descriptive words and phrases you may choose to show the items pictorially and in color. Several suggestions for the lists are the principal's autograph, a new cake of soap from the caretaker, a serviette from the school cafeteria, a book about dogs from the library.

To alert the children when the allotted time for the hunt has passed, you might choose to have them start the hunt about ten or fifteen minutes before afternoon recess. Then when the bell rings they will know that they are to return to the classroom with their "trophies".

MUSIC ACTIVITIES

1. School Sounds

Point out to the children that there are sounds that are special only to schools. Have the children use a tape recorder to collect sounds in the classroom, sounds in the hall, and sounds on the playground.

Check whether the children can identify all the sounds after they have recorded them. Have the children give each sound a name. You may wish to have the children make books that illustrate how each sound was made and show the name given to it.

LESSON OUTCOME

Recognize a set of ten; recognize and print the numeral 10; recognize the word *ten*

Materials

display board and cutouts, flash cards showing from zero to ten objects, overhead projector and transparencies of sets of objects (optional), an index card for each child

Vocabulary

ten, digits

Background

Ten is the basis for our system of numeration. Understanding how to work with ten is also the key to understanding our system of measurement. Treat ten as a very special number.

RELATED ACTIVITIES

- Give each child an index card. Have the children make a number concept card for *ten* to complete their sets for *zero to ten*.
- Have the children continue their number charts by drawing or pasting pictures of ten objects and printing 10 beside them. Print the word *ten* on a strip of paper for each child. Have the children paste the word beside the numeral 10 on their number charts.
- Have the children cut pictures from catalogues and magazines for making sets of ten in orderly arrangements.

Mark.

10 ten Unit 7

Use a ✓ to show sets of ten.

Print.

Recognizing sets of ten; printing the numeral 10 (one hundred twenty-seven) 127

LESSON ACTIVITY

Before Using the Page

- Place seven cutouts on the display board and ask how many there are. Ask one child to place another cutout to make a set of eight. Ask another child to place another cutout to make a set of nine. Place one more cutout and introduce the word *ten*. Print the numeral 10 on the chalkboard. You need not mention place value at this time, but you may wish to indicate that for *ten* and some of the numbers that follow, we use two *digits* for the numerals.
- Use flash cards or an overhead projector to show, at random, sets having from one to five members. Ask how many there are in each set. The children should recognize how many there are without counting. Then show sets having from six to ten members. At first, flash pictures of objects in random arrangements. Then flash pictures of objects in orderly arrangements. The children will realize that it is much easier to recognize the number associated with a set having many members when they are arranged in definite patterns.

- Have several children practise printing 10 on the chalkboard. Make sure that they begin by printing the 1 first and then the 0.
- Read the poem on page T191 for this page. Point out that we have ten fingers on both hands and ten toes on both feet.

Using the Page

- Direct the children's attention to the blue beads at the top of the page. Ask how many beads there are. Have the children point to the numeral 10 and read the word *ten*.
- Have the children mark only the sets that show ten objects.
- Have the children trace over the two broken 10's and then practise on their own to complete the row. When the children finish practising, ask them to print or paste their best 10 on the school bus.
- After the children have completed the page, you may wish to have them print above the hood of each bus the number of objects in each set.

LESSON OUTCOME

Record the number of a set having from seven to ten members

Materials

blocks, display board and cutouts, flash card for *ten*, number tray, cards for the numerals 0 to 10, flash cards for the words *zero* to *ten*

RELATED ACTIVITIES

- Have the children make a chart showing pictures of ten animals grouped by twos. Display this chart and have the children use it for counting by twos – two, four, six, eight, ten.
- You may wish to extend the train activity suggested in *Before Using the Page* by making a train on the bulletin board. Use envelopes decorated with wheels to represent the cars. Have children place numeral and word cards in the appropriate cars.

How many ?

128 (one hundred twenty-eight)

Identifying sets of seven to ten

Print the correct numeral for each set.

LESSON ACTIVITY

Before Using the Page

- Read the poem on page T191 for this page. Have children say each number in turn and place one block for each car. Have a child pretend to be the engine of the “train”. Have a second child place her / his hands on the shoulders of the first child and pretend to be a car. Continue until ten children form the “train”.
- Place sets of from six to nine cutouts on the display board. Ask children to make each set into a set of ten. Emphasize that ten cutouts is one more than nine cutouts, and nine cutouts is one fewer than ten cutouts.
- Display a set of ten cutouts, ask how many there are, and then hold up the flash card with the word *ten*. Ask if someone knows the word. Use the card several times during the day to strengthen recognition of the word in preparation for Unit 8.
- Make a number tray for *ten* in the same way as for *zero* to *nine*. While the children watch, print the word *ten* on a strip of paper or a label and paste it on the end of the number tray.

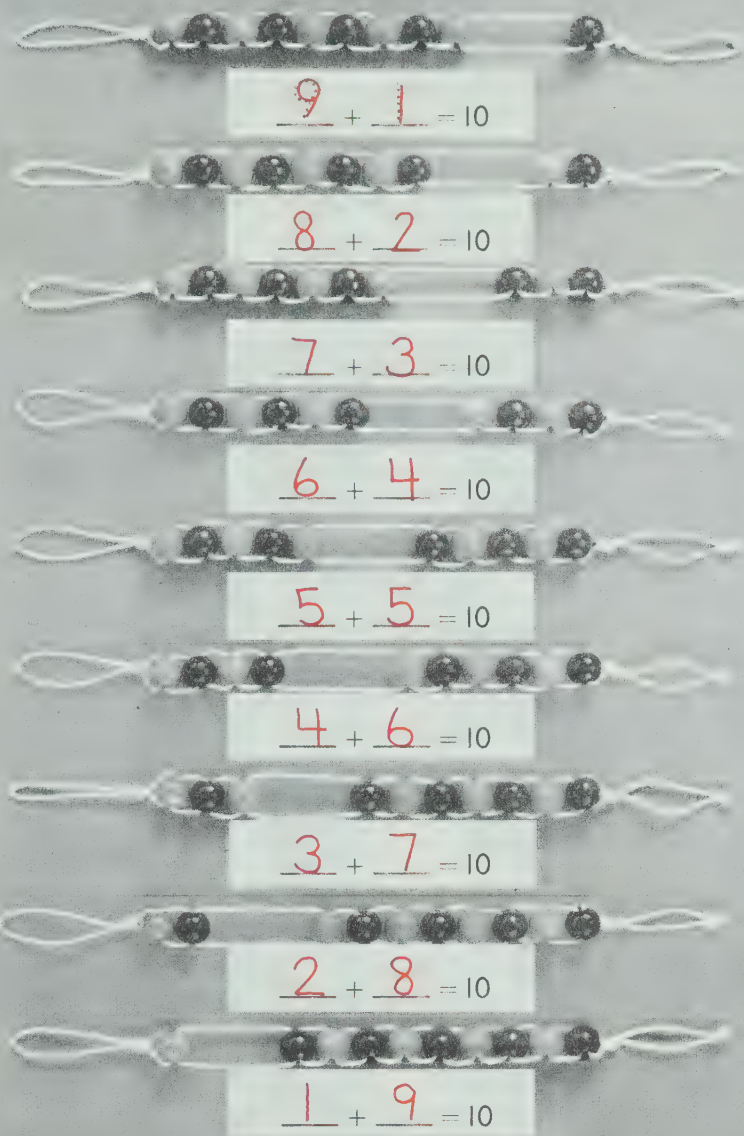
Place the tray in sequence beside the trays for *zero* to *nine*.

- Display the word and numeral cards for each of the numbers from zero to ten. Have children take turns selecting the corresponding numeral and word cards.

Using the Page

- Have the children record the number of beads in each set.
- After the children have completed the page, make up problems similar to the following:
 1. Find the third blue set holder. How many orange beads are there? How many more beads are needed to make a set of ten?
 2. Find the second yellow set holder. How many green beads are there? How many more beads are needed to make a set of ten?
 3. How many sets have ten beads? How many sets have only nine beads? How many sets have only eight beads? How many sets have only seven beads?

Complete.



Addition facts, sums of 10

(one hundred twenty-nine) 129

LESSON OUTCOME

Identify number combinations for ten

Materials

elevator beads for each child (See page xxxi.)

RELATED ACTIVITIES

- Give each child ten counters, a loop of string, and a sheet of paper. Ask the children to separate their ten counters into two groups in different ways. Have them write an addition sentence for each way.



- Adapt the activity given for page 64 on page T325 for the number ten.

LESSON ACTIVITY

Before Using the Page

• Have the children use their elevator beads. Ask them to move all the beads to one end of the string. Ask how many beads there are at that end of the string (10) and how many there are at the other end of the string (0). Write $10 + 0 = 10$ on the chalkboard. Ask the children to separate four beads from the group of ten and to move them to the other end of the string. Ask how many beads there are at that end and how many beads there are at the other end of the string. Write $6 + 4$ on the chalkboard. Ask how many beads there are altogether. Have a child complete the addition sentence ($6 + 4 = 10$) on the chalkboard.

Ask the children to show the ten beads at one end of the string again and then to separate the ten beads in another way. Have a child record the addition sentence on the chalkboard. Then have the children find other ways to separate the group of ten beads. Challenge them to find the eleven different number combinations for 10 ($10 + 0, 9 + 1, 8 + 2, \dots, 0 + 10$).

Using the Page

- Ask the children to arrange their beads as shown in the first picture. Ask how many beads there are in the first group and have them trace over the dotted 9. Ask how many beads there are in the second group and have them trace over the dotted 1. Ask how many beads there are in all and have a child read the completed addition sentence. Ask the children to move one more bead so that their beads are grouped as shown in the second picture. Then have the children work independently.

LESSON OUTCOME

Complete addition sentences for sums to 10; show the sequence of numbers from 1 to 10

Materials

the number trays for *one to ten*,
elevator beads for each child

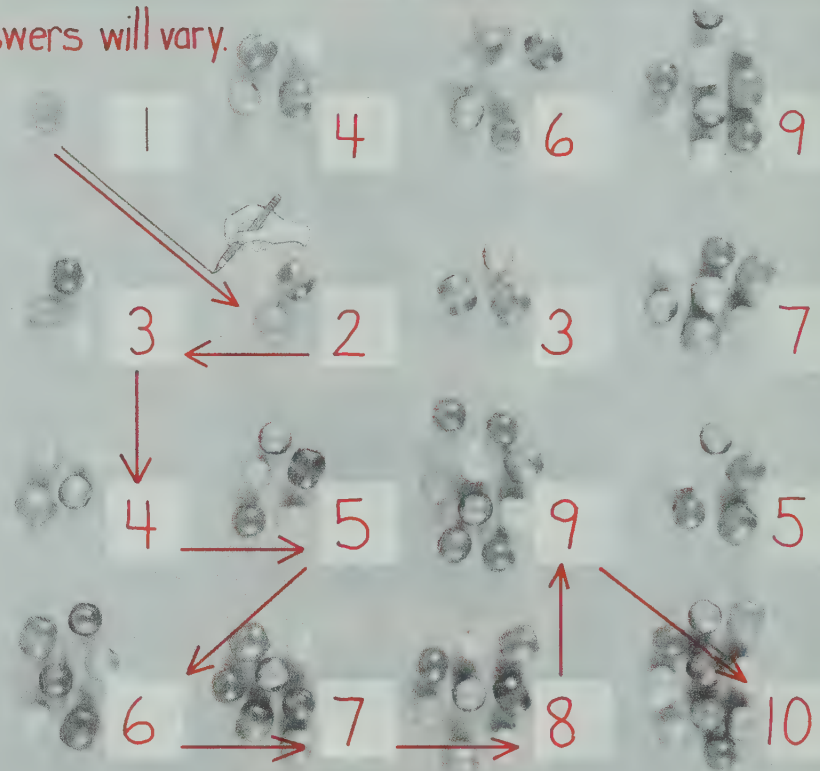
RELATED ACTIVITIES

- When the children have completed the page, have them group their elevator beads to illustrate $9 + 1 = 10$. Then have them turn their set of beads around and ask which number combination for 10 is shown ($1 + 9$). Repeat for other combinations for 10.
- Give the children a supply of stirrers, straws, or tongue depressors to be bundled into groups of ten. Each group may be fastened together with a rubber band, a twist tie, or a pipe cleaner. These groups of ten objects will be useful for later work with the numbers to nineteen in Unit 8.
- Read the poem on page T191 for this page. Have the children do the actions as you read the poem.

Complete.

$4 + 2 = 6$	$6 + 2 = 8$	$8 + 2 = 10$
$1 + 3 = 4$	$4 + 3 = 7$	$7 + 3 = 10$
$0 + 5 = 5$	$5 + 5 = 10$	$10 + 0 = 10$

Answers will vary.



Show how many there are in each set. Use arrows to show a path from 1 to 10.

130 (one hundred thirty)

Adding, sums to 10; ordering the numbers from 1 to 10

LESSON ACTIVITY

Before Using the Page

- Place the empty number trays for *one to ten* at random on a table. Ask the children to fill each of the trays with the appropriate number of objects. Then ask a child to arrange the trays in order. Ensure that a left-to-right sequence in increasing order is shown. Have the children count from 1 to 10 and from 10 back to 1, as you point to each tray. Then ask questions similar to the following:
 “Which tray comes after (before) the tray for *eight*?”
 “Which tray comes between the trays for *three* and *five*?”
 “Which tray has one fewer than the tray for *seven*?”
 “Which tray has the most objects? the fewest objects?”
- Ask the children to hold one loop of their elevator beads so that the beads hang vertically with the ten beads at the top. Ask the children to move each bead in turn to the bottom as they count from 1 to 10. Then ask them to turn the set of beads around and hold them by the other loop so that the ten beads are shown again at the top. Have the children use the beads to

illustrate addition facts having sums to ten. Say for example, “Bring down three beads. Bring down four more beads. Join the two groups of beads. How many beads are there in all? What addition sentence describes what happened?”

For each new example, have the children begin with the ten beads at the top.

Using the Page

- Direct the children’s attention to the string of beads at the top of the page. Ask how many beads there are. The children may use these as counters to help in completing the addition sentences at the top of the page.
- For the second part of the page, have the children record the number of beads in each set. Then have them begin at 1 and draw arrows from one set to the next in sequence, according to the number of objects in each set. After a path from 1 to 10 has been drawn, encourage the children to use a different color and draw a different path from 1 to 10. Many paths are possible. Some children may find it easier to draw the sets on a sheet of paper and then mark the second path. You may wish to display all the paths the children have found.

LESSON OUTCOME

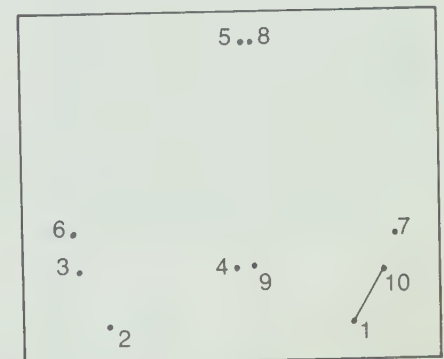
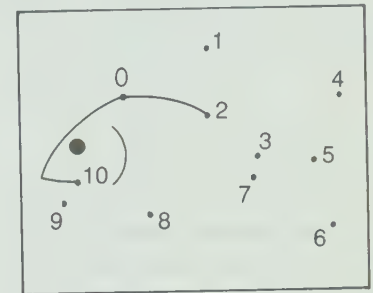
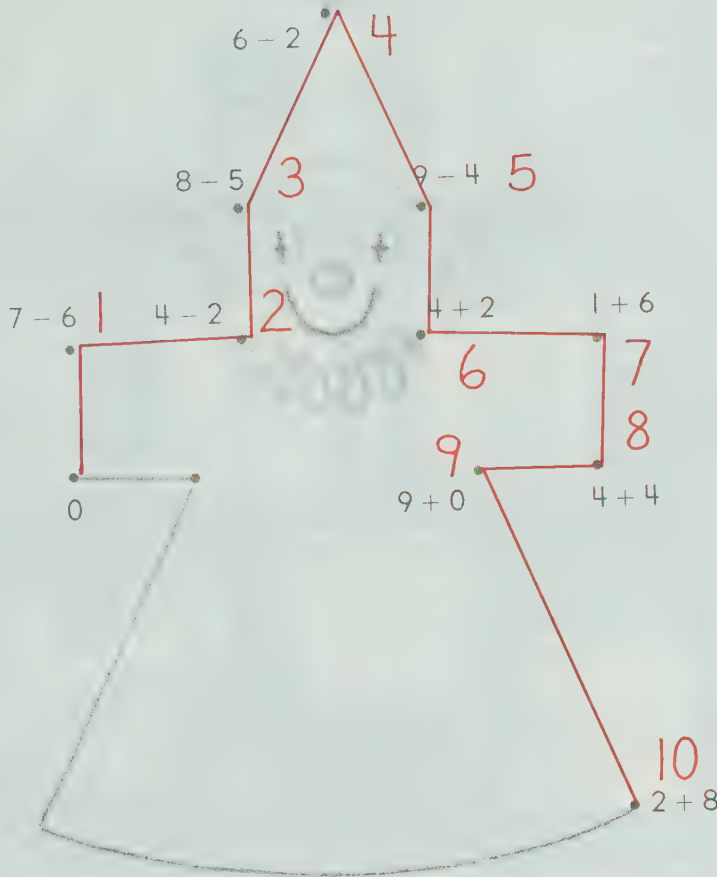
Add or subtract and then show the results in sequence

Materials

Unifix cubes, gummed shapes, or graph paper, crayons for each child

RELATED ACTIVITIES

- Make several large dot-to-dot pictures and cover them with acetate. The children can use them in their spare time for reviewing the sequence of numbers and for practising addition and subtraction facts having sums to 10.



Add or subtract as indicated. Join the dots in order.

Ordering the numbers from 0 to 10

(one hundred thirty-one) 131

LESSON ACTIVITY

Before Using the Page

- Have the children fasten Unifix cubes together to make "trains" of from one to ten cubes. Then have them arrange the "trains" in order. If you do not have Unifix cubes, the children can use gummed shapes or they can color inside squares on graph paper.
- If you used the Unifix cubes, choose the "trains" for four and six and have children, in turn, find the "train" for the number that comes before, the "train" for the number between the two, and the "train" for the number that comes after. Repeat several times for other pairs of "trains".
- Display the "train" of ten Unifix cubes. Ask how many cubes there are in the "train". Break the "train" into two parts. Ask children in turn how many cubes there are in each part. Join the two parts and ask a third child to state the corresponding addition sentence. Have a fourth child write the addition sentence on the chalkboard. Break the "train" in a differ-

ent way and repeat the procedure. Continue until the "train" has been broken in at least five different ways.

Ask children in turn to break some of the other "trains". Ask how many cubes there are in each part and have other children state and write the corresponding addition sentences. Then adapt the activity for reviewing subtraction facts.

Using the Page

- Discuss with the children how they are to proceed on the page. Have them add or subtract as indicated and print the numeral beside the dot. Then have them connect the dots in order from 0 to 10. If necessary, children may use the ten "balls" at the top of the page as counters.

After the children have completed the page, you may wish to have them color the clown's coat and hat. The ten "balls" at the top of the page can be used to review ordinal number concepts and colors. Give the children instructions similar to the following:

1. Color the first ball red.
2. Color the last ball black.
3. Color the fifth ball blue.
4. Color the third ball yellow.

LESSON OUTCOME

Complete basic addition facts for sums to 10

Materials

spinner, ten counters and a sheet of paper for each child

RELATED ACTIVITIES

- Have the children make a list of the basic addition facts having sums of 10. Have them write the addition sentences in order:

$$1 + 9 = 10$$

$$2 + 8 = 10$$

$$3 + 7 = 10$$

$$4 + 6 = 10$$

$$5 + 5 = 10$$

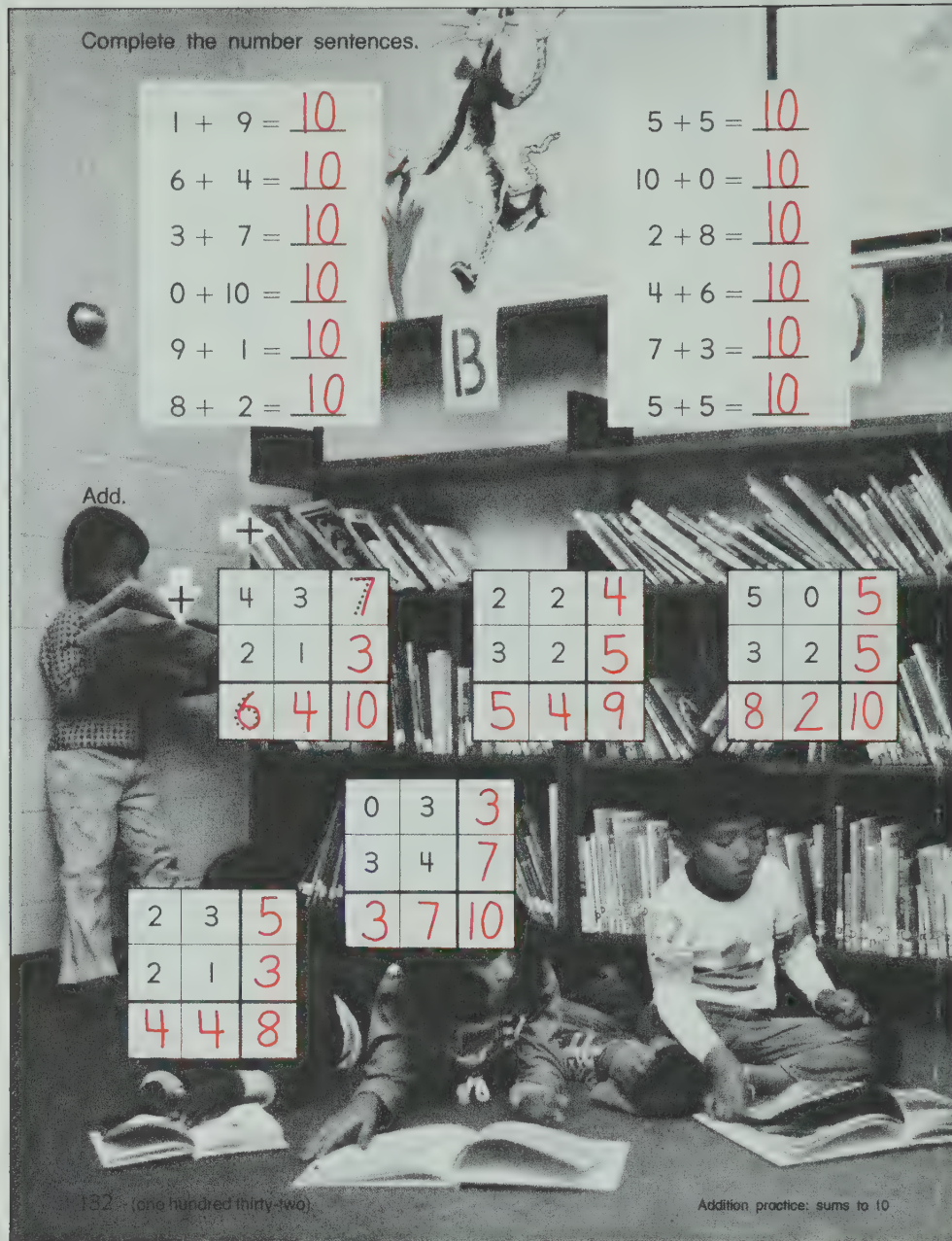
$$6 + 4 = 10$$

$$7 + 3 = 10$$

$$8 + 2 = 10$$

$$9 + 1 = 10$$

- After the children have completed the page, ask questions similar to these:
 “If I have 9, how many more do I need to make 10?”
 “If I have 6, how many more do I need to make 10?”
 “If I have 4, will 5 more make 10?”



LESSON ACTIVITY

Before Using the Page

- Display a large demonstration spinner as shown. Tell the children that they will be writing addition sentences having sums of 10, but the spinner will be used to choose numbers. Spin the arrow. If it stops at 5, have the children choose five of their ten counters and find how many more make ten altogether. Have them write the corresponding addition sentence ($5 + 5 = 10$). When all the children have written the number sentence, write the correct one on the chalkboard so that the children can check their own work.



- Draw several diagrams on the chalkboard similar to the following:



Have the children add the numbers across and down and place each sum in the frame at the head of the arrow. The entry for the frame in the lower right corner serves as a check since it must be the same whether the numbers are added across or down.

Using the Page

- For the first part of the page, have the children complete the addition sentences having sums of 10. For the second part of the page, have the children follow the procedure described in *Before Using the Page*.

Complete.

10 - 3 = 7 10 - 4 = 6 10 - 7 = 3

10 - 5 = 5 10 - 1 = 9 10 - 8 = 2

10 - 6 = 4 10 - 2 = 8 10 - 9 = 1

10 - 0 = 10 10 - 10 = 0

Subtraction facts, minuends of 10

(one hundred thirty-three) 133

LESSON OUTCOME

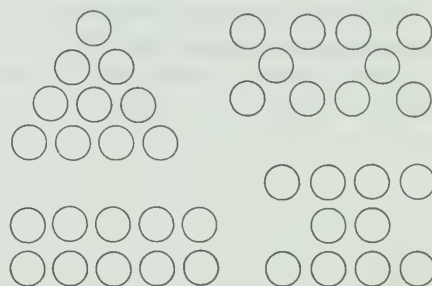
Complete subtraction sentences for minuends of 10

Materials

spinner, elevator beads and a sheet of paper for each child

RELATED ACTIVITIES

- Give each child ten round objects such as bottle caps, or ten gummed circular shapes. Ask the children to arrange the objects in a "pyramid pattern" as shown below. Have them draw a picture of the pattern. Then have them arrange the ten objects in different patterns and copy the patterns on paper, to discover as many patterns as possible for *ten*.



- Have children work in pairs so that one child shows a subtraction situation using elevator beads and the other child states the corresponding subtraction sentence.

LESSON ACTIVITY

Before Using the Page

• Use the large demonstration spinner described on page T174. Provide each child with a sheet of paper and have the children use their elevator beads. Ask them to move all the beads to one end of the string and to hold one loop so that the beads hang vertically with the ten beads at the top. Ask how many beads there are (10). Spin the arrow on the spinner. If it stops at 3, have the children "take away" three beads from the group of ten (move three beads to the other end of the string). Ask how many beads are left at the top. Review that the operation suggested is subtraction. Write $10 - 3$ on the chalkboard, ask a child to complete the sentence on the chalkboard ($10 - 3 = 7$), and have the children write the subtraction sentence on their papers.

Have the children start with ten beads again. Spin the arrow and have the children move the corresponding number of beads. Ask them to write the subtraction sentence. Write the

correct sentence on the chalkboard so that the children can check their own work. Repeat the procedure several times.

- Draw ten "beads" on the chalkboard and then write $10 - 8 = \underline{\quad}$ below them. Tell the children that you cannot move the "beads" but you would like to show eight beads being removed. Lead them to suggest drawing a ring around eight of the beads and marking one large X on them. Ask a child to complete the subtraction sentence.

Using the Page

- Discuss the first exercise with the children. Have them trace over the dotted ring around the three erasers and mark a large X on them. Have the children count the erasers that are not ringed, and trace over the dotted 7. Ask how many rubber bands they will ring for the third exercise. Then let them proceed on their own. When the children have completed all the exercises, refer to each picture in turn and ask a child to read the corresponding subtraction sentence.

LESSON OUTCOME

Complete basic subtraction facts for minuends to 10

Materials

flash cards for subtraction phrases from $10 - 0$ to $10 - 10$, ten counters and number concept cards for each child

RELATED ACTIVITIES

• Read the poem on page T191 for this page. Whenever you come to a number name, pause and have the children say the number. You may wish to have the children illustrate this poem by using a series of pictures. The first picture can show ten in the bed and the last picture can show one in the bed. Each of the eight pictures in between can show one child falling out of bed. The corresponding subtraction sentence can be written under each picture; that is, $10 - 1 = 9$, $9 - 1 = 8$, $8 - 1 = 7$, and so on.

Complete the number sentences.

$4 - 2 = 2$

$4 - 3 = 1$

$4 - 4 = 0$

$5 - 2 = 3$

$5 - 3 = 2$

$5 - 4 = 1$

$6 - 2 = 4$

$6 - 3 = 3$

$6 - 4 = 2$

$7 - 2 = 5$

$7 - 3 = 4$

$7 - 4 = 3$

$8 - 2 = 6$

$8 - 3 = 5$

$8 - 4 = 4$

$9 - 2 = 7$

$9 - 3 = 6$

$9 - 4 = 5$

$10 - 2 = 8$

$10 - 3 = 7$

$10 - 4 = 6$

Subtract.

10	—
0	10
1	9
2	8
3	7
4	6
5	5
6	4
7	3
8	2
9	1
10	0

10	—
7	3
2	8
6	4
8	2
1	9
5	5
10	0
3	7
9	1
0	10
4	6



134 (one hundred thirty-four)

Subtraction practice: minuends to 10

LESSON ACTIVITY

Before Using the Page

- Have the children sing and dramatize this song:

Ten green bottles
Hanging on the wall.
Ten green bottles
Hanging on the wall.
If one green bottle
Should happen to fall,
There'd be nine green bottles
Hanging on the wall.
Nine green bottles
(etc.)

The children may enjoy illustrating this song in ten separate pictures with the appropriate subtraction sentence written below each picture ($10 - 1 = 9$, $9 - 1 = 8$, $8 - 1 = 7$, and so on).

- Display a flash card of the series from $10 - 0$ to $10 - 10$. Have the children work with their counters and hold up the

appropriate number concept card when they have found the answer. Repeat as often as you think necessary to provide adequate practice before the children begin the page.

Using the Page

- For the first part of the page, have the children complete the subtraction sentences by column.
- For the second part of the page, ask, "What is the answer when you subtract 0 from 10?" Have the children trace over the dotted 10. Then ask, "What is the answer when you subtract 7 from 10?" Have the children trace over the dotted 3. Let the children continue on their own. Remind them that each number is to be subtracted from 10. Children who have difficulty may use the ten crayons as counters.
- After the children have completed the page, discuss the patterns for subtraction sentences by column and by row. For example, as the first number in each subtraction sentence is increased by one, the difference is increased by one when the same number is subtracted each time. It is not necessary to use the word *difference* with the children to denote the result of subtraction; the word "answer" or "result" can be used.

OBJECTIVE

Complete basic addition and subtraction facts, sums and minuends to 10

Materials

ordinary dice, two markers

RELATED ACTIVITIES

• Begin giving short timed tests of addition and subtraction facts having sums and minuends to 10. Begin with facts that the children are likely to find easy, for example, facts for which one of the addends is 0 or 1. (See page T165 for possible procedures for testing.) From the results for each child you should identify the strengths and weaknesses, first according to the sums, and then by combinations for each sum. With this information, appropriate practice, or reteaching and practice, can be planned.

START

10

1 + 1 = 2

3 - 2 = 1

4 - 0 = 4

4 + 4 = 8

9 + 1 = 10

6 + 4 = 10

9 - 3 = 6

8 + 2 = 10

7 - 6 = 1

5 + 5 = 10

10 - 6 = 4

10 - 4 = 6

10 + 0 = 10

7 + 3 = 10

8 - 6 = 2

10 - 0 = 10

10 - 2 = 8

10 - 5 = 5

6 + 3 = 9

8 + 1 = 9

10 - 1 = 9

10 - 3 = 7

4 + 6 = 10

10 - 7 = 3

3 + 7 = 10

7 + 2 = 9

10 - 8 = 2

8 - 4 = 4

5 + 4 = 9

10 - 10 = 0

6 + 1 = 7

10 - 9 = 1

5 + 3 = 8

7 - 3 = 4

4 + 5 = 9

9 - 5 = 4

1 + 7 = 8

4 + 3 = 7

6 - 4 = 2

4 + 1 = 5

HOME

Addition and subtraction practice: sums and minuends to 10

(one hundred thirty-five) 135

LESSON ACTIVITY**Before Using the Page**

• Divide the children into two teams for a game to provide practice in addition and subtraction. Draw the following race track on the chalkboard.

Start	5	8	10	6	8
9					7
6					4
4	10	7	4	5	9

Each team will need a marker. Have the first child on team A roll a die. According to the number on the die, tell the child whether to add it to or subtract it from the first number on the track. If the child answers correctly, the marker for team A is placed in the first frame. Then the first player of team B has a

turn. If the child answers correctly, the marker for team B is also placed in the first frame. Now the second player on each team has a turn. If a player answers incorrectly, the marker for that team cannot be moved forward. The team whose marker returns to START first is the winner. More than two teams could play this game, if you wish.

Using the Page

• You may wish to have the children write the answers for all exercises before they play the game. The game may be used as a spare-time activity for the children. Because the game is not self-checking, you may wish to choose a leader who will check each answer from a master sheet as the game progresses.

The game is played by rolling an ordinary die and moving a marker the number of spaces indicated on the die. Before the marker can stay on a new "block", its player must add or subtract correctly the two numbers given. If the response is incorrect, the marker is returned to the "block" it previously occupied. The player whose marker first reaches HOME is the winner.

LESSON OUTCOME

Recognize subtractive situations and write the corresponding subtraction sentences

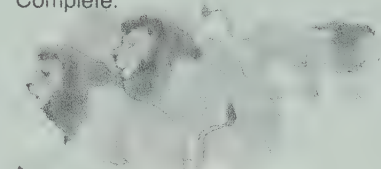
Materials

flash cards for the words *zero* to *ten*

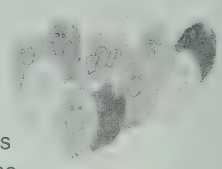
RELATED ACTIVITIES

- Have the children suggest simple stories involving addition and subtraction situations and illustrate them. They can exchange these with other children who try to interpret them and state the corresponding number sentences.

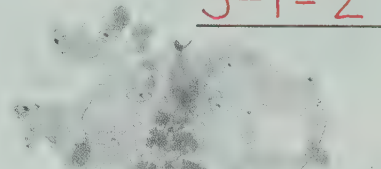
Complete.




Three fat lions
Sitting in a zoo
One went to Africa
And then there were two
 $3 - 1 = 2$



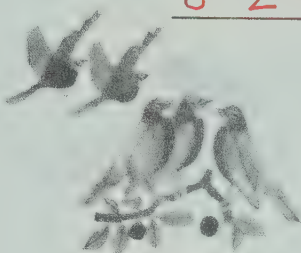
Ten big balloons
Feeling quite fine
But one went POP
And then there were nine
 $10 - 1 = 9$



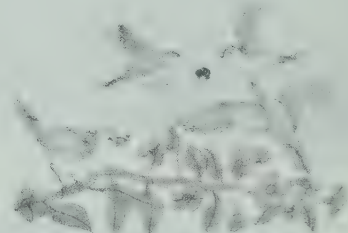
Eight little beavers
Gathering up sticks
Two went swimming
And then there were six
 $8 - 2 = 6$



Seven fluffy kittens
Playing on the floor
Three went to bed
And then there were four
 $7 - 3 = 4$



Five red robins
Sitting in a tree
Two flew away
And then there were three
 $5 - 2 = 3$



Four gray sparrows
Chasing a honeybee
One found a fly
And then there were three
 $4 - 1 = 3$

136 (one hundred thirty-six)

Write a subtraction sentence for each rhyme.

Recognizing subtractive situations

LESSON ACTIVITY

Before Using the Page

- Have the children listen as you recite this rhyme.

Six busy honeybees
Working in a hive.
One went to gather honey
And then there were _____.

Stop when you come to the final word of the rhyme and allow the children to say it. The correct response (five) should come easily because it completes the rhyme. Have the children repeat the rhyme with you. Draw six honeybees on the chalkboard. Have a child send one out to gather honey (mark it with an X). Ask how many bees are left. Ask another child to write the subtraction sentence ($6 - 1 = 5$) under the drawing. Repeat the procedure with the following rhymes.

Ten woolly mittens
Hanging on a line.
One fell down
And then there were (nine).

Six playful ponies
Learning how to run.
Five stopped to drink
And then there was (one).

Make up other rhymes for the children to complete and illustrate. Encourage some of the children to make up rhymes for other children to complete. If rhymes do not come easily to you or the children, make up simple stories that involve subtractive situations and have the children state the corresponding subtraction sentences.

Using the Page

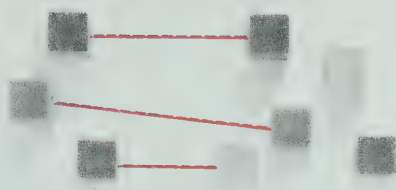
- Have the children look at the first rhyme and the accompanying picture. Read the rhyme to the children while they follow the words on their pages. Stop when you come to the final word and ask a child to say it. Display flash cards for the words *zero* to *ten* and have a child select the appropriate flash card. Then have the children print the word to complete the rhyme and write the appropriate subtraction sentence for the situation. Repeat the procedure for the other rhymes.

Match and complete.

I have

Pat has

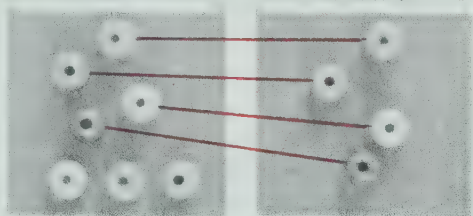
How many more has Pat ? 2



I have

Pat has

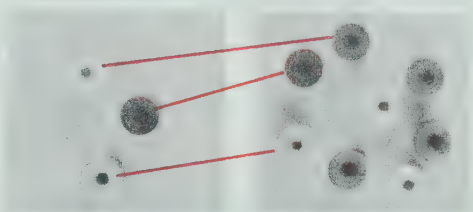
How many more have I ? 3



I have

Pat has

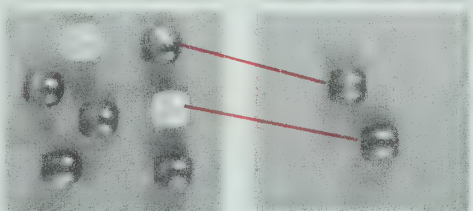
How many more has Pat ? 5



I have

Pat has

How many more have I ? 5



Introduction to the concept how many more through one-to-one matching

(one hundred thirty-seven) 137

LESSON OUTCOME

Use one-to-one matching to find how many more there are in one set than in another

Materials

display board and cutouts, pieces of string, cards showing the numerals from 1 to 10, a sheet of paper for each child

Vocabulary

I have, Pat has, how many more

Background

The children have already had experiences in matching one to one and in deciding which of two sets has more (fewer) members. Now the children are asked to determine how many more members there are. This is a second way of interpreting subtraction, which will be needed later in many problem-solving situations.

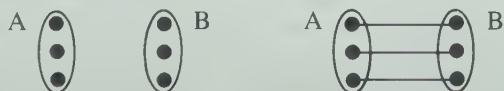
RELATED ACTIVITIES

- From a box of small objects, have each child in the group take a handful. Ask children to match their objects one to one with other children and to state who has more and how many more. Have some children try to find other children who have the same number of objects as they have.

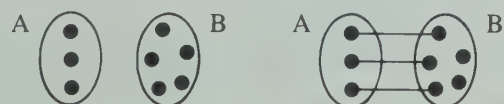
LESSON ACTIVITY

Before Using the Page

- Display two equivalent sets. Have a child use pieces of string to match the objects in the two sets. Point to set A and say to the child, "This is your set." Point to set B and say, "This is my set. Who has more?" Repeat for several other pairs of equivalent sets.



- Display two non-equivalent sets. Follow the procedure suggested above, but ask one more question, "How many more?" The children can count the unmatched objects in one set for the answer. Repeat for several other pairs of non-equivalent sets.



- Ask each child to choose a card at random from a pile of cards showing the numerals from 1 to 10. On sheets of paper, have children draw objects to correspond to the number for the card. Have each child choose a second card (or choose a partner), draw the objects required, and then match the objects in the two sets. For each pair, ask, "Which set has more?" Also ask, "How many more?" for pairs of non-equivalent sets.

Using the Page

- Read the instruction and the words with the children. Have them trace over the three lines for matching in the first exercise. Ask how many more Pat has and have the children print the answer. Then have them trace over the lines for matching in the second exercise and continue on their own.
- After the children have completed the page, you may wish to have them print the numeral for the number of objects in each set. Then in the space to the right of each pair of books, they can write the appropriate subtraction sentence ($5 - 3 = 2$, $7 - 4 = 3$, $8 - 3 = 5$, $7 - 2 = 5$).

LESSON OUTCOME

Write subtraction sentences for comparison situations and find *how many more* and *how many fewer*

Materials

display board and cutouts, pieces of string

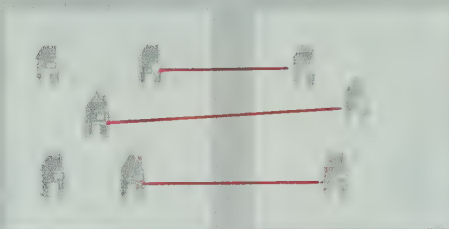
RELATED ACTIVITIES

From a box of small objects, have each child in the group take any number from one to ten. Ask children to match their objects one to one with other children and to state who has more and who has fewer. Have the children write the corresponding subtraction sentence for each two sets of objects being compared.

Match and complete.

I have

Pat has



I have 5. Pat has 3.

$$5 - 3 = \underline{2}$$

I have 2 more than Pat.

Pat has 2 fewer than I.

I have

Pat has



I have 6. Pat has 3.

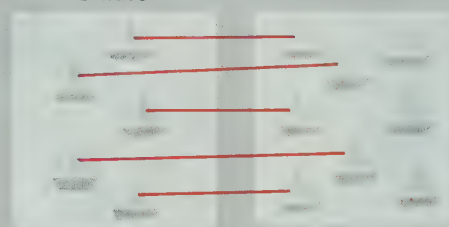
$$6 - 3 = \underline{3}$$

I have 3 more than Pat.

Pat has 3 fewer than I.

I have

Pat has



Pat has 8. I have 5.

$$8 - 5 = \underline{3}$$

Pat has 3 more than I.

I have 3 fewer than Pat.

I have

Pat has



I have 7. Pat has 4.

$$\underline{7} - \underline{4} = \underline{3}$$

I have 3 more than Pat.

Pat has 3 fewer than I.

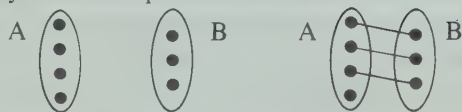
138 (one hundred thirty-eight)

Comparing by one-to-one matching and subtraction

LESSON ACTIVITY

Before Using the Page

- Display two non-equivalent sets.



Have a child use pieces of string to match the objects in the two sets. Point to set A and say to the child, "This is your set." Point to set B and say, "This is my set. Who has more? How many more?" Ask another child, "Who has fewer? How many fewer?" Write the subtraction sentence on the chalkboard, for example, $4 - 3 = 1$. Draw attention to the fact that the difference of the two numbers is the same as the number of unmatched objects. In other words, the difference tells how many more (fewer) there are in one set than in the other.

Repeat for several other pairs of non-equivalent sets. Print on the chalkboard the statements that appear on page 138. Have the children complete the sentences for each pair of non-equivalent sets.

- Have each of two children pretend to have from one to ten objects and state the numbers. Ask other children to state who has more, and who has fewer. To find how many more (fewer), have one group of children draw the corresponding sets and use one-to-one matching. Have the other children write the corresponding subtraction sentence. Ask two children to show their work on the chalkboard. Emphasize that the two methods give the same result.

Using the Page

- Read the instruction and the words with the children. Have them trace over the three lines for matching in the first exercise. Ask how many I have. Have the children write the answer. Ask how many Pat has. Have the children write the answer. Then have the children complete the subtraction sentence and note that the difference, 2, is the same as the number of unmatched houses. Have the children complete the exercise. Read the completed statements.

Let the children who can read the statements work independently.

LESSON OUTCOME

Recognize a dime and know that it is equivalent to ten pennies and its value is 10 cents; make change from 7, 8, 9, and 10 cents

Materials

real money, play money, or coin cutouts from copies of page T337, flash card for the word *dime*, small objects with tags showing prices from 1¢ to 9¢

Vocabulary

dime, spent, bought

Background

The dime is introduced here so that money can be seen as an application for sums to 10 cents. Many children will have had experiences with the dime, but the idea that one dime has the same value as ten pennies or two nickels will probably be new to them.

RELATED ACTIVITIES

- Have the children write subtraction sentences for the situations at the top of page 139 ($10 - 4 = 6$, $9 - 6 = 3$, $7 - 2 = 5$, $8 - 5 = 3$). Similarly, have the children write addition and subtraction sentences for the five exercises in the second chart ($3 + 2 = 5$, $10 - 5 = 5$; $6 + 4 = 10$, $10 - 10 = 0$; $3 + 5 = 8$, $10 - 8 = 2$; and so on).
- Adapt the activity involving "bills" suggested on page T150.

dime 10 cents 10¢

I had 10¢.

I spent 7¢.

I have 3¢.

I had	I spent	I have
10¢	4¢	<u>6</u> ¢
9¢	6¢	<u>3</u> ¢
7¢	2¢	<u>5</u> ¢
8¢	5¢	<u>3</u> ¢

I had	I bought		I have
10¢	3¢	2¢	<u>5</u> ¢
10¢	6¢	4¢	<u>0</u> ¢
10¢	3¢	5¢	<u>2</u> ¢
10¢	7¢	2¢	<u>1</u> ¢
10¢	4¢	3¢	<u>3</u> ¢

Introduction to the dime; amounts to 10 cents

(one hundred thirty-nine) 139

LESSON ACTIVITY

Before Using the Page

- Review the value of the penny, the value of the nickel, and what the symbol ¢ means. Review the fact that five pennies have the same value as one nickel.
- Display sets of pennies and nickels with values to 9 cents. Have children tell the value of each set of coins.
- Display a set of nine pennies and then add one more. Ask how many pennies there are. Display a dime and compare it to a penny with respect to color, shape, and size. Introduce the word *dime* and show the word on a flash card. Discuss the idea that ten pennies have the same value as one dime.
- Give each child a set of coins consisting of five pennies and one nickel. Hold up a small item showing a price from 1¢ to 9¢. Have a child choose the coins necessary to "buy" the item. Ask the child to state what coins are left and their value. Repeat for other items having prices to 9¢.
- Give each child a dime. Hold up a small item showing a price from 1¢ to 9¢. Ask a child to state how much money he /

she would have left if he / she "bought" the item. If the child cannot respond immediately, the dime may be exchanged for either ten pennies or one nickel and five pennies to help the child arrive at the answer. Repeat for other individual items and then extend the examples to include the purchase of two items that can be bought for 10 cents or less.

Using the Page

- Have the children point to the dime and read the words. Discuss the worked example with the children and have them trace over the dotted 3. The four exercises at the right are to be completed in the same way. Some children may need real money or play money to help them.
- For the second chart, have the children record the cost of the two items together to help in determining how much money they have left.
- After the children have completed the page, have them solve problems similar to the following:
 1. If I buy the marble and the ball, how much money will I spend? How much money will I have left from 10 cents?

LESSON OUTCOME

Copy geometric shapes onto a geoboard or geopaper

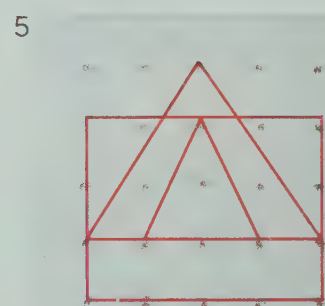
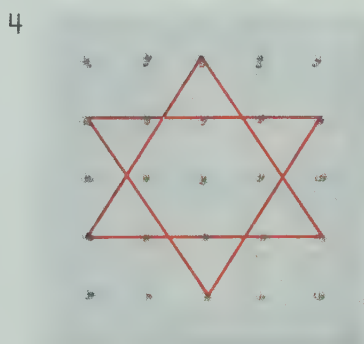
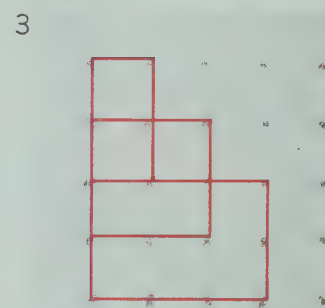
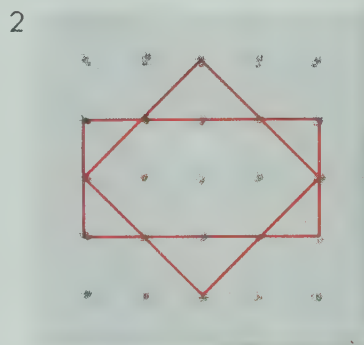
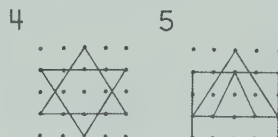
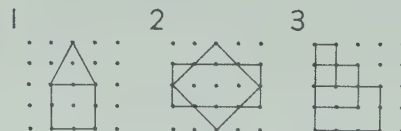
Materials

a geoboard and rubber bands (various colors, if possible) for each child, copies of page T332 or T333, transparent geoboard and overhead projector (optional)

RELATED ACTIVITIES

- Prepare designs on geopaper. Display or distribute the designs and have the children practise copying them onto geoboards or copies of page T332 or T333 in their spare time. Have the children color parts of the designs on the geopaper to make colorful patterns.

Copy the shapes.



140 (one hundred forty)

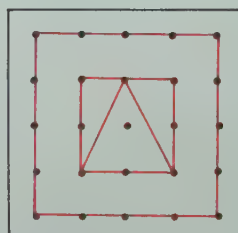
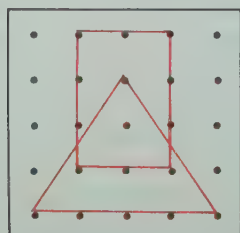
Copying geometric shapes

LESSON ACTIVITY

Before Using the Page

- Work with the children in groups according to the number of geoboards you have. If you have no geoboards, make copies of page T332 or T333 for geopaper.

If possible, use a transparent geoboard on the overhead projector. Other possibilities are to make an array of 25 dots on the chalkboard, or use large graph paper, and place dots at the intersections of lines. Draw a simple design involving some of the dots as shown.



Discuss with the children whether they will need one or two rubber bands to make the design on their geoboards. When the children have made the design, ask questions such as:

- “What shapes do you see in the design?”
- “Which shape is the largest?”
- “Which shape is the smallest?”
- “Are there any shapes that are the same size?”
- “How many triangles can you find in the design?”

Have children make designs of their own and ask them questions about the different shapes in each design.

Using the Page

- Have the children make each design on their geoboards, if available, and then copy the design onto the page. If geoboards are not available, have the children work directly on the page. While the children are working independently, move about the classroom and ask questions to determine the children's understanding of such terms as *triangle*, *square*, *rectangle*, *side*, *the same size as*, *larger than*, *smaller than*, *as long as*, *longer than*, *shorter than*, *inside*, *outside*, *above*, *below*.

Change the shapes.

LESSON OUTCOME

Reproduce given shapes on a geoboard

Materials

a geoboard and rubber bands for each child, copies of page T332 or T333, transparent geoboard and overhead projector (optional)

RELATED ACTIVITIES

- Make cards showing shapes to be copied on geoboards or geopaper. Have the children work at these in their spare time.
- Have the children challenge one another in making shapes that have certain restrictions, for example, a triangle that touches six pegs and has one peg inside.
- Challenge the children to change from the last shape on page 141 (the large square) to a large triangle that touches eight pegs. If the children were successful at that, have them change from the triangle to a rectangle that touches ten pegs.

On a geoboard, copy the first shape and then change it to the next shape

Working with geometric shapes

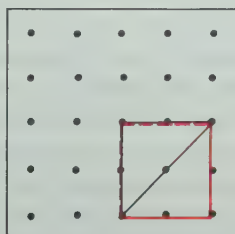
(one hundred forty-one) 141

LESSON ACTIVITY

Before Using the Page

• Work with the children in groups according to the number of geoboards you have. If you have no geoboards, make copies of page T332 or T333 to use as geopaper. Note that the activity is more effective if you use geoboards instead of geopaper, and it is easier to demonstrate using a transparent geoboard with an overhead projector.

Make an array of 25 dots on the chalkboard, or use large graph paper, as suggested on page T182. Draw a triangle for the children to copy, using rubber bands on their geoboards. Using another color draw a second shape, part of which belongs to the first shape. Have the children change the shape on their geoboards to a shape that corresponds to the second shape on the chalkboard.



If you use geopaper instead of geoboards, have the children copy the first shape onto geopaper. Then have them use a different color to draw the second shape. Encourage the children to draw over as much of the first shape as they can when they draw the second shape.

Using the Page

• Have the children place a rubber band on their geoboards in the first position shown. Discuss the shape and ask them to identify it. Have the children stretch the rubber band to make the second shape. Discuss the shape and ask them to identify it. Ask them to tell how it is different from the first shape. Have the children stretch the rubber band to make the third shape. Discuss the shape, ask the children to identify it, and compare it with the first shape and/or the second shape. Have the children stretch the rubber band to make the fourth shape. Ask how many sides and how many corners the shape has. Have the children stretch the rubber band to make the fifth shape and then the last shape. Continue to question the children about relationships between the shapes; for example, "How many fewer sides has the last shape than the fifth shape?"

LESSON OUTCOME

Recognize 10 as 1 ten and identify sets of tens from 1 ten to 9 tens

Materials

straws or stirrers, rubber bands

Vocabulary

tens

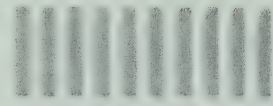
RELATED ACTIVITIES

- Give each child a handful of beans or other large seeds. Have the children record the number of beans they have by making tallies on paper.

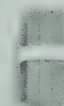
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When they have a tally for each bean, ask them to ring two groups of five tallies to make one ten. Then ask them to count how many tens they have. If they have extra beans, ask the children to state how many they need to make one more group of ten. Have them go to the supply and get that many more beans. If you prefer, have the children give the remaining beans to other children who need them to complete a group of ten.

How many ?



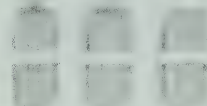
10



1 ten



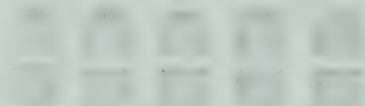
2 tens



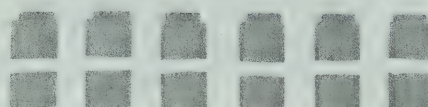
3 tens



4 tens



5 tens



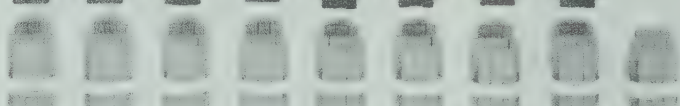
6 tens



7 tens



8 tens



9 tens

142 (one hundred forty-two)

Identifying the number of sets of tens

LESSON ACTIVITY

Before Using the Page

- Display ten objects that can be bundled, for example, straws or stirrers. Ask a child to count them and to write 10 on the chalkboard. Put a rubber band around the objects and explain that a bundle of ten can be thought of as "1 ten". Write "1 ten" on the chalkboard beside the 10. Have children assemble other bundles. Place two of the bundles together and ask how many there are. Lead the children to respond "2 tens". Write "2 tens" on the chalkboard.

Have children display in turn 3 tens, 4 tens, and 5 tens. After each group of tens is displayed, have children state the number of tens. Write the number of tens on the chalkboard. Repeat the procedure for 6 tens to 9 tens.

- Draw bundles of sticks to show from 1 ten to 9 tens in a column on the chalkboard. Print the word "tens" beside each set of tens. Have children in turn record the number of tens.

Using the Page

- Direct the children's attention to the single purple sticks. Ask how many there are. Have the children trace over the dotted 10. Ask how many bundles of ten the single sticks would make. Have the children trace over the dotted 1. While the children work independently on the page, move about the classroom and ask children to tell you how many there are when you cover some of the bundles with your hand. For example, if you cover the first two bundles of orange sticks and ask how many there are, the reply should be "4 tens".

- You may also wish to have the children compare the sets of tens. Ask them questions similar to the following:
 "How many more blue tens are there than yellow tens?"
 "How many more orange tens are there than blue tens?"
 "How many rows have red tens?"
 "How many more tens are there in the second row of red tens than there are in the first row of red tens?"
 "How many more tens are there in the second row of green tens than there are in the first row of green tens?"
 "How many fewer yellow tens are there than orange tens?"

LESSON OUTCOME

Identify and represent sets of tens from 1 ten to 9 tens; write the numerals for tens from 10 to 90

Materials

objects in groups of ten, beans, plastic bags, twist ties

Vocabulary

twenty, thirty, forty, fifty, sixty, seventy, eighty, ninety

RELATED ACTIVITIES

- Have the children prepare bundles of straws or stirrers for 10, 20, 30, 40, . . . , 90. Label the bundles with the appropriate names – 1 ten (10), 2 tens (20), and so on. This activity permits the children to become familiar with the order of the numbers, to associate size with a number, and to relate symbols, words, and number of bundles at the same time.
- Because the elevator beads show ten beads on a string, children may use nine sets to show counting by tens to 90. Have each of nine children, in turn, display a set of elevator beads as all the children count by tens to 90. The children may hang each set by the loop, on individual hooks or nails.

Complete.

1 ten		10
2 tens		20
3 tens		30
4 tens		40
5 tens		50
6 tens		60
7 tens		70
8 tens		80
9 tens		90

Identifying and representing sets of tens

(one hundred forty-three) 143

LESSON ACTIVITY

Before Using the Page

• Display a group of ten. Remind the children that “1 ten” is another name for “ten”. Write “1 ten” and “10” on the chalkboard. Display 2 tens. Ask the children how many tens there are. Ask if anyone knows the special name for 2 tens. If not, say, “Two tens are *twenty*.” Write “2 tens” and “20” on the chalkboard. Repeat the procedure up to “5 tens” and “50”, introducing the words, *thirty*, *forty*, and *fifty*.

Have children display, in turn, 6 tens, 7 tens, 8 tens, and 9 tens. After each group of tens is displayed, have children state the number of tens and introduce the special name for each (*sixty*, *seventy*, *eighty*, *ninety*).

From the group of 9 tens, ask children in turn to select a given number of tens according to your instructions; for example, “Beth, show us 5 tens.” Ask another child to make the statement, “Five tens are fifty.” Ask a third child to write “50” on the chalkboard. Continue the sequence for 60, 70, 80, and 90. Then ask for groups of tens at random.

Have the children look at the chalkboard, and ask them questions of the following types:

“How many tens are needed to show *seventy*?”

“If I have fifty, how many tens have I?”

“Is sixty greater than or less than seventy?”

“Is forty less than or greater than fifty?”

• Work with small groups of children. Give each child a handful of beans and small plastic bags. Ask the children to place 10 beans in a bag for “1 ten”. Have each group prepare a given number of tens. Secure the bag with a twist tie and keep the bags for use in subsequent lessons.

• Have the children repeat in unison, “One ten is ten, two tens are twenty”, and so on to “nine tens are ninety”.

Using the Page

• Have the children look at the beads in the first row. Ask how many beads there are. Ask the children to check whether there are ten beads in each group. At the left, have them print the numerals for the groups of tens and at the right, the standard two-place numerals. For 6 tens, 8 tens, and 9 tens, have the children make simple drawings.

LESSON OUTCOME

Count by tens from 10 to 90 by using dimes

Materials

real money, play money, or coin cutouts from copies of page T337, small objects with tags showing prices from 10¢ to 90¢

Vocabulary

how much

RELATED ACTIVITIES

- Give each child a random number of pennies. Have the children make groups of ten pennies and exchange each group for a dime from a "storekeeper" who has a supply of dimes.
- Mark items with prices from 10 cents to 90 cents for the play store. Give each child a random number of dimes. Have each child buy an item for which he / she has enough dimes. Encourage the children to count by tens as they pay the "storekeeper".

How much ?

144 (one hundred forty-four)

Counting by tens with dimes

LESSON ACTIVITY

Before Using the Page

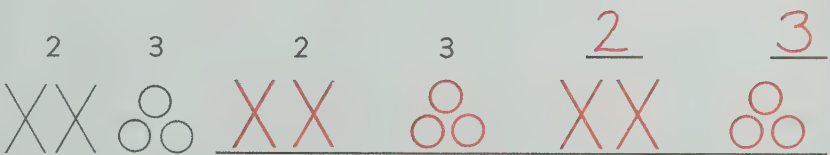
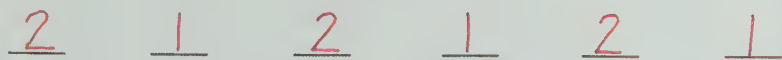
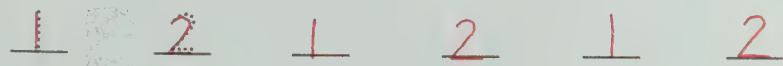
- To review the names of groups of tens to *ninety*, have a child stand in front of the class and hold up both hands. Ask other children how many fingers the first child has (ten). Ask the child to place both hands together with the fingers interlaced. Refer to the clasped hands as 1 ten. Have a second child join the first child, clasp both hands, and say, "Two tens are twenty." Continue until the ninth child says, "Nine tens are ninety." While the children are still standing in a row, ask a child to come and point to each of the children in turn and to count by tens to 90.
- Display stacks of ten pennies and have the children count by tens. Ask the children what coin can be used to replace ten pennies. Display a dime and ask what its value is (10 cents). Display two dimes. Ask what the value of the two dimes is (20 cents). Continue to display one more dime each time and ask the value of the dimes. Lead the children to observe that dimes are counted in the same way as groups of ten.

- Display a number of dimes and have the children count to find how much money there is by using the words *ten*, *twenty*, *thirty*, and so on. Repeat several times.
- Display an item showing a price from 10 cents to 90 cents. Have a child state how many dimes are needed to "buy" the item. Repeat several times.

Using the Page

- Direct the children's attention to the purple button. Ask how many dimes are shown beside it. Ask what the value of five dimes is. Have the children trace over the dotted 50. Ask how many dimes are shown beside the rock. Ask what the value of the dimes is. Have the children print the numeral and then continue on their own.
- After the children have completed the page, you may wish to make up problems similar to the following:
 1. Which item is the most (least) expensive? How much does it cost? How many dimes are needed to buy it?
 2. If I have four dimes, which of the objects can I buy? (Note that there is a choice of three items.)

Complete.



Complete each pattern and count the shapes.

Associating patterns of shapes and numbers

(one hundred forty-five) 145

LESSON OUTCOME

Continue the pattern of a sequence involving sets of objects and write the corresponding numbers

Materials

attribute blocks, display board and cutouts

RELATED ACTIVITIES

- Have the children use any materials that would be suitable for making patterns, for example, gummed shapes, parquetry blocks, Unifix cubes, or beads. When the children have made their patterns, have them copy the shapes onto sheets of paper and color them. Display some of these around the classroom.
- You may wish to illustrate some patterns without relying on concrete materials. For example, have the children listen to the following pattern: clap, clap, snap, clap, clap, snap and then continue it and describe it using numbers (2 1 2 1).

Have children illustrate the pattern: step, hop, hop, step, hop, hop and describe it (1 2 1 2).

- After the children have completed the page, you may wish to have them color the first two patterns according to your instructions. The first pattern could be red, blue, blue, red, blue, blue; the second pattern could be green, green, purple, green, green, purple.

LESSON ACTIVITY

Before Using the Page

- Use attribute blocks to review patterns with the children. Make patterns based on color, shape, and size. Ask the children to describe each pattern and explain how to continue it. Have several children make patterns and ask other children to describe them.
- Make a pattern on the display board, using shapes as shown.



Have the children associate numbers with the pattern; that is, one triangular shape and three circular shapes. Repeat with other patterns of shapes.

- Make the following pattern on the chalkboard.



Ask the children how many squares there are before the triangle. Print the numeral 2 below the squares. Have children,

in turn, record the number of triangles next, the number of squares next, and so on to obtain the pattern 2 1 2 1 2 1. Repeat with other patterns of shapes.

- Write the number pattern 1 2 1 2 1 2 on the chalkboard. Have children draw shapes, for example,



to show that they understand the pattern. Repeat with other patterns of shapes.

Using the Page

- Ask children to describe the first pattern (square, circle, circle, square, circle, circle) and then continue it. Ask how many squares and how many circles there are in the pattern. Have the children trace over the dotted 1 and the dotted 2 and then continue the number pattern.

Have the children follow a similar procedure for the next three patterns. For the last exercise, have the children complete the number pattern and then draw the outlines required to illustrate the pattern.

OBJECTIVE

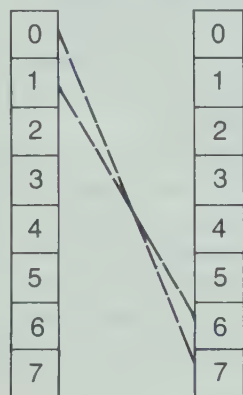
Complete basic addition and subtraction facts, sums and minuends to 10

Materials

demonstration number strips, number strips prepared from copies of page T341 for each child, overhead projector (optional)

RELATED ACTIVITIES

- Have the children write all the sums (differences) for various positions of their number strips.
- Ask the children to show the numbers from 0 to 7 in order in each of two columns. Then ask them to match each number in one column with a number in the second column so that the sum of the two numbers is 7. The activity may be adapted for sums to 10. Children frequently relate the resulting diagram to a teeter-totter.



Complete

$$2 + 3 = 5$$

$$3 + 3 = 6$$

$$4 + 3 = 7$$

$$2 + 4 = 6$$

$$3 + 4 = 7$$

$$4 + 4 = 8$$

$$2 + 5 = 7$$

$$3 + 5 = 8$$

$$4 + 5 = 9$$

$$2 + 6 = 8$$

$$3 + 6 = 9$$

$$4 + 6 = 10$$

$$\begin{array}{r} 5 \\ + 0 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 2 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 1 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 3 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 5 \\ \hline \end{array}$$

$$5$$

$$7$$

$$9$$

$$6$$

$$8$$

$$10$$

$$\begin{array}{r} 1 \\ + 6 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ + 4 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ + 3 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 2 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ + 1 \\ \hline \end{array}$$

$$7$$

$$7$$

$$7$$

$$7$$

$$7$$

$$7$$

$$6 - 4 = 2$$

$$6 - 5 = 1$$

$$6 - 6 = 0$$

$$7 - 4 = 3$$

$$7 - 5 = 2$$

$$7 - 6 = 1$$

$$8 - 4 = 4$$

$$8 - 5 = 3$$

$$8 - 6 = 2$$

$$9 - 4 = 5$$

$$9 - 5 = 4$$

$$9 - 6 = 3$$

$$\begin{array}{r} 10 \\ - 10 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 6 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 2 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 0 \\ \hline \end{array}$$

$$0$$

$$2$$

$$4$$

$$6$$

$$8$$

$$10$$

$$\begin{array}{r} 9 \\ - 7 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ - 6 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ - 3 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ - 2 \\ \hline \end{array}$$

$$2$$

$$2$$

$$2$$

$$2$$

$$2$$

$$2$$

146 (one hundred forty-six)

Addition and subtraction practice: sums and minuends to 10

LESSON ACTIVITY

Before Using the Page

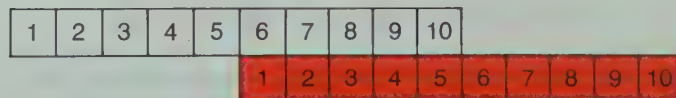
- Prepare two large number strips for the numbers 1 to 10 or prepare two transparencies, each showing a number strip from 1 to 10. Color one of the strips red. Display the red strip above the white strip as shown.



Point to the 3 on the white strip and the 1 on the red strip and ask, "What is the sum of 3 and 1?" When the answer is given, point to the 4 below the 1. Point to the 3 on the white strip and the 2 on the red strip and ask, "What is the sum of 3 and 2?" Point to the 5 below the 2. Continue this procedure until the children realize that the positions of the two strips show the sums of 3 and 1, to 3 and 7. Then give each child two similar number strips prepared from copies of page T341. Have the children place their two strips in positions to show the sums of

3 and 1, to 3 and 7. Emphasize that the first addend is always 3. Then show them how to slide the red strip to the right so that the first addend is always 5. Have the children state all the sums that can be obtained for these and other positions of the strips.

- To show subtraction, place the red strip below the white strip. The numbers will appear as subtraction exercises in vertical form. For the positions shown below, the difference is always 5 and is seen on the white strip.



Using the Page

- Point out that the first part of the page involves addition and the second part involves subtraction. You may wish to have the children use their number strips to check their answers. When they have completed the exercises, discuss the patterns of the answers for groups of exercises.

OBJECTIVE

Complete basic addition and subtraction facts, sums and minuends to 10

Materials

elevator beads or number strips described on page T188 (optional), flash cards for addition and subtraction facts having sums and minuends to 10, flash cards for the words *one* to *ten* (optional)

RELATED ACTIVITIES

- Have children work in small groups using the flash cards prepared for this lesson. One child in each group is the leader and holds up several flash cards in turn. The other children state the number named, using elevator beads, if necessary, to find the sum or the difference. The leader can check the responses if the answer is shown on the back of each flash card.

Ring the names for each number.

Addition and subtraction practice: sums and minuends to 10

(one hundred forty-seven) 147

LESSON ACTIVITY**Before Using the Page**

- You may wish to begin with a review of basic addition and subtraction facts having sums and minuends to 10. The children may use elevator beads or the number strips described for the lesson on page T188.
- Determine which children in your class have a middle name as well as a first name. Tell the children that in some countries, persons may have three or four names, particularly kings, queens, and their children. Then review with the children that a number also has many names. Hold up a card showing $2 + 1$ and ask what number is named. Hold up a card showing $4 - 1$ and repeat the question. Tell the children that $2 + 1$ and $4 - 1$ are two names for the number three. Hold up a card showing $2 + 2$ and ask whether it shows a name for the number three. Hold up other cards and ask similar questions. Children may help to sort the cards into groups according to the numbers named. Then have them count the names for each number. You may wish to include cards that show the words for numbers.

Using the Page

- Direct the children's attention to the word "Ring" at the top of the page. Ask what number is shown at the point of the first pencil. Note that the number is shown two ways, the word and the standard numeral. Ask why $4 + 1$ is ringed. Ask the children to find another name for five that they should ring. Have children explain whether they should ring $2 + 2$, $6 + 1$, or $8 - 4$.

Ask what number is shown at the point of the second pencil. Ask the children which of the names they should ring for this number. Lead them to suggest that they should ring only the names for seven. Then let them work on their own, but caution them to pay close attention to the symbols $+$ and $-$.

OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

RELATED ACTIVITIES

- Prepare the pocket chart described on page T191 for children to practise addition and subtraction facts.

Complete.

1 2 3 4 5 6 7 8 9
10 20 30 40 50 60 70 80 90

$4 + 2 = \underline{6}$ $4 + 3 = \underline{7}$ $6 + 2 = \underline{8}$
 $4 + 5 = \underline{9}$ $5 + 2 = \underline{7}$ $4 + 6 = \underline{10}$

$\begin{array}{r} 5 \\ +5 \\ \hline 10 \end{array}$ $\begin{array}{r} 3 \\ +6 \\ \hline 9 \end{array}$ $\begin{array}{r} 3 \\ +7 \\ \hline 10 \end{array}$ $\begin{array}{r} 0 \\ +8 \\ \hline 8 \end{array}$ $\begin{array}{r} 1 \\ +9 \\ \hline 10 \end{array}$ $\begin{array}{r} 5 \\ +3 \\ \hline 8 \end{array}$

$5 - 3 = \underline{2}$ $8 - 6 = \underline{2}$ $7 - 5 = \underline{2}$
 $7 - 3 = \underline{4}$ $8 - 4 = \underline{4}$ $9 - 6 = \underline{3}$

$\begin{array}{r} 6 \\ -2 \\ \hline 4 \end{array}$ $\begin{array}{r} 10 \\ -4 \\ \hline 6 \end{array}$ $\begin{array}{r} 8 \\ -3 \\ \hline 5 \end{array}$ $\begin{array}{r} 9 \\ -4 \\ \hline 5 \end{array}$ $\begin{array}{r} 10 \\ -2 \\ \hline 8 \end{array}$ $\begin{array}{r} 7 \\ -4 \\ \hline 3 \end{array}$


1 4 1 4 1 4 1 4
1 2 3 1 2 3 1 2 3
3 2 1 3 2 1 3 2 1

I had 10¢.

I spent 7¢.

I have 3 ¢.

Pat has 

I have 

How many more has Pat? 2

148 (one hundred forty-eight)

CHECKUP

LESSON ACTIVITY

Before Using the Page

- The order of numbers from 1 to 10, counting by tens to 90, comparison subtraction, number patterns, and addition and subtraction facts with sums and minuends to 10 form the basis for the exercises on this page. Before you assign the exercises, you may wish to review some of these topics.

Review the order of the numbers to 10 by asking questions such as these:

“What number comes after 5?”

“What number comes before 9?”

“What number comes between 2 and 4?”

Have the children count by tens to 90. Ask these questions:

“How many tens come after 3 tens? before 5 tens?”

“What name do we give 4 tens?”

“What name do we give 8 tens?”

“Are 7 tens more than or less than 6 tens?”

“Is 50 greater than or less than 40?”

“Is 30 greater than or less than 20?”

Draw the following pattern on the chalkboard.

• • • • • • • • • • • • • _____

Ask a child to describe the pattern and then show how to continue it. Ask another child to state the number pattern associated with it (2 4 6 2 4 6).

For reviewing addition and subtraction facts, you may wish to use one of the activities described in this unit, for example, the one involving the racetrack suggested on page T177.

Using the Page

- Draw attention to the word *Checkup* at the bottom of the page. Have the children recall that such pages review work they have taken and help them to determine their understanding of that work.

Discuss the different types of exercises with the children to ensure that they know what to do. You may wish to have them complete the problems at the bottom of the page first, under your guidance. Then let the children work independently.

Games and Activities

Poem for page 127

FINGERS AND TOES

Five fingers on one hand
And five on the other,
Just like my sister,
Just like my mother.

Five toes on one foot,
Five on the other,
Just like my father,
Just like my brother.

There's no need for guessing.
Everyone knows
Five is the number
For fingers and toes.
(Or you could say the number
Is ten, I suppose.)

Merlin Millet

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Poem for page 128

I'll make a train
And go for a ride,
Here are the cars
Side by side.
One (place one block)
Two (place another block behind the first)
(Continue to ten)
Oh! Oh! Oh!
Off we go,
Ten little cars
All in a row. (Push the "train" forward.)

Poem for page 130

With a hop, and a skip, and a jump –
One, two,
Stand up straight like the soldiers do.

With a hop, and a skip, and a jump –
Three, four,
Crouch down small, very near to the floor.

With a hop, and a skip, and a jump –
Five, six,
Rock from side to side like a clock that ticks.

With a hop, and a skip, and a jump –
Seven, eight,
Pretend that your feet are a very heavy weight.

With a hop, and a skip, and a jump –
Nine, ten,
Creep along slowly, like a lion to his den.

W. O'Neill

Poem for page 134

There were ten in the bed,
And the little one said,
"Roll over. Roll over."
They all rolled over
And one fell out.

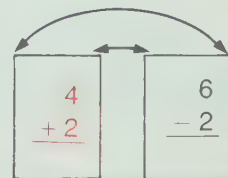
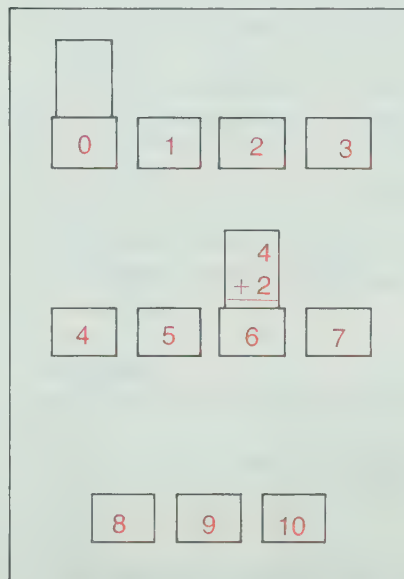
There were nine in the bed,
and the little one said,
"Roll over. Roll over."
They all rolled over
And one fell out.

etc.

There was one in the bed,
And the little one said,
"Alone at last!"

Pocket Chart for page 148

Prepare a pocket chart from cardboard and library card pockets or envelopes as shown. On one side of the sheet of cardboard, paste eleven pockets to hold addition fact cards and write the numerals from 0 to 10 in red. On the other side of the sheet, paste eleven pockets to hold subtraction fact cards and write the numerals from 0 to 10 in green.



Prepare cards showing addition facts in vertical form in red. On the back of each card, show the related subtraction fact in vertical form in green. (There will be 66 cards if all the zero facts are included.)

Children can practise addition and subtraction facts by placing a card in the appropriate answer pocket. This pocket chart can also be used for finding all the subtraction fact cards that belong in the pocket for 8, for example. There will be three cards as shown below.

$$\begin{array}{r} 10 \\ - 2 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ - 1 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ - 0 \\ \hline \end{array}$$

Unit 8 Overview

Place value is introduced in this unit in developing the number concepts and numeration of the numbers from 10 to 19. Ordering these numbers emphasizes the increase in only the number of ones. Dimes and pennies are used to reinforce the place-value aspects of the numerals. Joining and separating sets leads to families of related basic addition and subtraction facts having sums and minuends to 10; for example, $4 + 2 = 6$, $2 + 4 = 6$, $6 - 2 = 4$, and $6 - 4 = 2$. Simple word problems are solved using addition and subtraction number sentences. Values to 19 cents are recorded as numerals and are shown in terms of dimes and pennies. Non-standard units are used for measuring the length of an object. Children learn to tell time and to record time, to the hour, on a dial clock. Various two-dimensional geometric shapes are examined to discover similarities and differences. Simple bar graphs are made and interpreted. The *Checkup* assesses the children's abilities to handle basic addition and subtraction facts having sums and minuends to 10, place value and numeration to 19, values of sets of coins for amounts to 19 cents, and reading and recording time, to the hour.

Unit Outcomes

Number

- write standard numerals and expanded-form numerals for the numbers from 10 to 19
- read and write the numerals in sequence to 19
- extend the numbers to 19 by adding ones to 10
- use 10 and the numbers 0 to 9 as addends
- use the number line for comparing numbers, to 19
- complete related basic addition and subtraction facts, sums to 6
- complete basic addition and subtraction facts, sums and minuends to 10
- solve problems, sums and minuends to 9
- use subtraction to solve word problems involving comparison

Measurement

- recognize values of sets of coins for amounts from 10 cents to 19 cents
- measure length using non-standard units
- read and record time, to the hour

Geometry

- recognize similarities and differences in two-dimensional shapes
- make and interpret bar graphs

Background

Number: Place value is mentioned for the first time in this unit in connection with the two-place numerals to 19. In Unit 7 the numeral 10 and the numerals for tens to 90 were presented without emphasis on the place values of the two digits. In this unit as the children build and study the numerals for the teen numbers, the digit 1 is recognized to mean one ten and the digit to its right, to indicate the number of ones. From this, the children learn the place-value names *tens' place* and *ones' place*.

In this unit, addition and subtraction are presented as *inverse* operations. Standing up and sitting down, and opening and shutting a door are examples of an operation and its inverse. Sometimes these are described as “doing” and “undoing” operations; the second operation “undoes” the first in each case. Keep in mind that “doing” should not be associated only with addition but with the action that takes place first, and this action might be one of separation (subtraction). One operation “undoes” the effect of the other, regardless of which comes first.

The inverse relationship between addition and subtraction makes it possible to organize basic number facts into sets. For unequal addends there are four related addition and subtraction facts, and for addends that are equal there are two related facts.

$$\begin{array}{ll} 7 + 2 = 9, & 2 + 7 = 9 \\ 9 - 2 = 7, & 9 - 7 = 2 \end{array} \qquad \begin{array}{l} 3 + 3 = 6 \\ 6 - 3 = 3 \end{array}$$

By considering all the related facts at the same time, children are helped in their attempt to recall them quickly and accurately. If, for example, $7 + 2$ is known but $2 + 7$ is not, knowing that these two are related can help to overcome the difficulty.

The inverse relationship between addition and subtraction is useful in solving problems when a missing addend or minuend must be found. For example, the missing addend in the number sentence $____ + 3 = 9$ can be found through the related subtraction sentence $9 - 3 = ____$. Similarly, the unknown minuend in $____ - 2 = 8$ can be found through the related addition sentence $8 + 2 = ____$. Also, the common practice of checking subtraction by using addition is possible because of the inverse relationship.

Using subtraction to compare two numbers, introduced in Unit 7, is reviewed in this unit through simple word problems. Problems should be read to those children who have difficulties in reading, so that they are not denied the opportunity of using their mathematical skills for solving word problems.

Measurement: Non-standard units for measuring length were introduced in Unit 6 and children discovered that many objects could not be measured exactly. In this unit, more opportunities are provided for children to express measurements to the nearest whole number of units. In a rather subtle and incidental manner, some of the children may develop an awareness that whole numbers alone cannot tell everything about quantities and measurements. For example, if an object is longer than 5 units but shorter than 6 units, its true length is obviously between 5 and 6 units, and there must, therefore, be some number between these two numbers. Concepts such as these should not be developed and extended at this time, but they do provide the kind of background necessary for fractions and decimals at a later stage.

Dimes and pennies are used to reinforce the concept of one ten and some ones. Children determine the amount of money (to 19 cents) represented by one dime and from one to nine pennies.

The concept of telling and showing time, to the hour, is introduced in this unit. Most children will be familiar with a clock and some may already be able to tell time, to the hour. At this time, children will be required to “read the hour” shown on a clock face and mark the hands on a clock face to show a given hour.

Geometry: Previous work on the geoboard involved reproducing geometric shapes and discussing the number of sides and the number of vertices. In this unit, shapes are investigated on a slightly more abstract level in that children note the ways in which shapes are alike or different. Some children may have no difficulty in reproducing shapes, but they may experience difficulty in verbalizing their observations. Guided discussion can ensure that children acquire clear and accurate concepts.

The horizontal bar graph was first introduced in Unit 5 and children became acquainted with this form of representing data. Because children will need help in interpreting a graph, valuable questions are suggested on page T205. The graph that the children will complete on page 157 will also provide an incidental review of triangular, rectangular, square, and circular shapes.

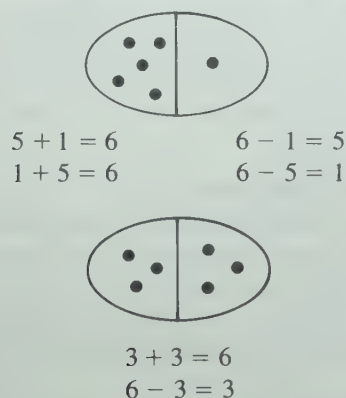
Teaching Strategies

Instruction in number concepts should follow the same grouping practices as in previous units. If frequent assessment is made of the children's progress, the results can be used to regroup them so that each child may have the optimum amount of challenge and success.

For the work with teen numbers, which requires materials that can be grouped in tens, the use of a variety of materials will help to encourage flexible thinking in children. (See page xxx for suggestions.) These may be stored in covered jars. There are various ways of grouping ten items together, for example, rubber bands, pipe cleaners, twist ties, or small plastic bags. Base Ten Blocks are particularly helpful for teaching the concept of tens and ones.

After children have had considerable practice in grouping ten ones as one ten, they may advance to the next stage in which ten ones are exchanged for one ten. Dimes and pennies are suggested in this unit because they are particularly suited to this purpose. For example, from a set of sixteen pennies, ten pennies may be exchanged for one dime. The amount, 16 cents, is represented by 1 dime and 6 pennies, and the numeral 16 clearly shows the number of tens (1 dime) and the number of ones (6 pennies).

Children may practise writing related addition and subtraction facts by first partitioning a set into two subsets. If the subsets are not equivalent, there are four related facts; if the subsets are equivalent, there are two related facts.



Further practice can be obtained by providing the children with an incomplete addition or subtraction sentence from which the related facts can be determined. For example, the subtraction sentence $5 - 2 = \underline{\quad}$ will lead to the four related facts: $5 - 2 = 3$, $5 - 3 = 2$, $3 + 2 = 5$, $2 + 3 = 5$.

For telling time, each child will be making a paper-plate clock face. This could be done in an art period prior to their use in the mathematics lessons. (See page T216.) For these lessons as well as for the work with geoboards, measurement, and bar graphs, children of different abilities may be grouped together.

The *Checkup* on page 170 will need to be supplemented by informal assessment of understanding and skills in measurement, geometry, and graphing. From the results, grouping for the next unit can be established.

Materials

display board and cutouts, string or yarn
 objects suitable for grouping in tens
 numeral cards for 1 to 19
 index cards for making number concept cards from 11 to 19
 square shapes, strips of ten squares
 two cans for a tens' holder and a ones' holder
 number line for permanent display
 real money, play money, coin cutouts from copies of page T337
 objects with tags showing prices from 10¢ to 19¢
 a card marked to show a set of five partitioned into groups of one and four
 flash cards having the shapes of triangles, squares, rectangles, and circles
 attribute blocks or suitable substitute
 geoboards, colored rubber bands, copies of page T332 or T333
 sets of ten or fewer objects in small plastic bags
 ten counters and crayons for each child
 flash cards for addition and subtraction facts having sums and minuends to 10
 number concept cards for 0 to 10 for each child
 dice or spinners marked from 1 to 6
 drinking straws, paper clips, sticks for measuring length
 paper strips of different lengths
 magazines, catalogues, pictures of clocks and clock faces
 demonstration clock, alarm clock
 a paper plate, cardboard hands, and a pronged metal fastener for each child

Vocabulary

eleven	tens' holder
twelve	ones' holder
thirteen	related facts
fourteen	about
fifteen	time
sixteen	clock
seventeen	clock face
eighteen	hour
nineteen	o'clock

Unit 8 Theme – In the Country

The purpose of this unit is to acquaint children with some aspects of life in a rural environment. Although the differences in rural and urban life are not so great as they were in the past, the children should be able to identify similarities and differences that exist today. The children should also be encouraged to compare their own lifestyles with those suggested in the unit.

Set up a farm display that will grow as the children contribute class and individual work. Provide a background of colored pictures showing kinds of farms, farm animals, and rural activities. If possible, display a collection of plastic models of farm animals. A sand table will be useful for creating a farm setting using the plastic models.

LANGUAGE ACTIVITIES

If your school is located in an urban area, use films, pictures, books, or try to arrange a tour of the nearest rural area to collect information for the following activity.

1. Communication in a Rural Community

In an urban community most people live next door to other people or there are other people living above or below them. A major difference in a rural community is the space allotted to individuals and to family groups. Farms located close together are not considered close according to urban standards.

When people are not situated close together, how do they communicate? Basically, the methods of communication are similar in the country and in the city, but there are differences.

Discuss with the children the necessity of communication in a rural community and the following aspects of it.

Mail

- Many farms have their own mailboxes located at the road where mail is delivered by a mail carrier in a car or a truck.
- Mail is also picked up from the mailboxes by the mail carrier. Discuss how the mail carrier knows that there is mail to be picked up.
- The farmer or a member of the family must walk or drive out to the mailbox to collect the mail.
- Mail may also be left and picked up at a central place, often a crossroad, where many mailboxes are located. In this case, the farmer or a member of the family must go even farther to collect the mail.

The Newspaper

- The newspaper often originates in a nearby town and serves the rural community by featuring news of local interest.
- A large city newspaper may also be delivered to a rural area. The newspaper is delivered to the mailbox by car or truck.

If possible, have samples of these two kinds of newspapers so that the children can compare them with respect to size and the number of pages.

The Telephone

- Most people on farms have telephones, except where they are very isolated or choose not to.
- Often many people must share the telephone line. Each

party has its own signal of rings to indicate when a call is to be answered. Discuss difficulties that this system might create.

- Many rural communities have modern dial telephones, but there are still some communities where a central operator must place the call to the desired party.

Visiting

- Many people in a rural community drive by car or truck to visit their neighbors, often on Sunday.
- A store in a nearby village or town is often a meeting place.
- An event such as an auction, a church social, or a town meeting provides a chance for the people to visit together.

The School

- The school is usually centrally located, sometimes in the country but now more often in a nearby village.
- Children travel to school by bus. They are picked up at the road that passes the farm.
- School activities that would normally take place at the end of the school day are usually held at noon hour, because some children may live many kilometres from the school.
- Some rural schools are small and have only one or two teachers to teach all the children in that community.

MATHEMATICS ACTIVITIES

1. Classifying

Using the plastic models of farm animals, discuss the various attributes of each. Determine different ways of sorting the animals. Some of the possible ways are

by size (big, medium-sized, small),
those we eat for food,
those that produce food for us,
those that have feathers.

Have the children, in groups or individually, sort the animals according to the ways listed.

2. Using Non-Standard Units of Length

Have the children use the plastic models as non-standard units of length. Let each child select a model and measure four things found at her/his desk. You may wish to have the children record the results in sentences; for example, "My pencil is 3 cows long."

3. Showing Time to the Hour

Try to obtain a film or a book that describes a day on a farm. After the children have viewed the film or heard the description, draw six large clock faces for showing time to the hour. Show a time on one of the clock faces and have children suggest an activity that might be happening on a farm at that time.

4. Problem Solving

Begin a discussion about life on a farm and some of the problems that farmers have to find solutions for. For each problem, have the children suggest things that the farmer might do to solve a particular problem. During the discussion, prob-

lems may be suggested over which the farmer has no control and thus must accept the situation. Have the children pretend that they are farmers and that they have to cope with such problems as the following: sick cattle, a barn that has burned down, a very heavy rain storm, a long dry spell, a cold spring, the need to purchase new machinery, a machine that has broken down, a hail storm that has destroyed the wheat crop, the crops to plant next year, the need for extra help to harvest a crop.

5. Geo-Shape Animals

Have the children paste gummed shapes on paper to make pictures of farm animals and then print the name beside each. Backgrounds may be filled in with crayons, pastels, or colored pencils.



6. Dot-to-Dot Animals

Display pictures of farm animals, for example, a cow, a horse, a sheep, a pig, a goat, a hen or rooster, a duck, a dog, and a cat. Provide the children with geopaper and ask them to draw from dot to dot to make a picture of their favorite farm animal. Make a display of the completed pictures.

SCIENCE ACTIVITIES

1. The Seasons

The seasons are very important in a farm environment because certain tasks are performed during each season.

Divide a large sheet of paper into four parts. Label each part with the name of a season. Have the children suggest tasks or events on the farm that depend on each season. Record these on the chart. Several suggestions are given below.

<p>Spring</p> <p>The farmer plants the crops.</p> <p>The animals begin to go outdoors.</p>	<p>Summer</p> <p>The farmer cares for the growing plants.</p> <p>The animals graze outdoors all day.</p>
<p>Fall</p> <p>The farmer harvests the crops.</p> <p>Machines are put away for the winter.</p>	<p>Winter</p> <p>The farmer repairs the machinery.</p> <p>The animals stay in the barns except for a few hours every day.</p>

2. The Farm Garden

When farming was of the subsistent variety, the farm garden was essential to provide food for the farmer and other members of the family. Now that there is easier access to sources of food, the vegetable garden is not so essential. Many farms still have gardens to provide fresh produce and to provide the satisfaction derived from growing things. Have the children suggest the names of fruits and vegetables that may be found in a vegetable garden. Make a list of these for reference. Have the children cut pictures from magazines and catalogues to illustrate each item.

You may wish to have the children classify the fruits and vegetables according to whether they are roots, leaves, or seeds of the particular plants.

3. Preserving Produce

Originally the produce from the farm garden provided food for the farmer's family throughout the winter. The fruits and vegetables had to be preserved in a variety of ways. Introduce the following ideas to the children:

canning	pickling
freezing	waxing
drying	cold storage

Discuss each method with the children. List items that can be preserved each way. Some foods, such as apples, can be preserved by several methods. Try to obtain canned applesauce, frozen apple slices, dried apple slices, apple pickles, and whole apples for the children to taste and compare.

4. Seed Display

Begin a collection of dried seeds for your classroom. In the beginning confine the collection to those seeds that one can obtain from farm crops and produce in Canada. Try to collect as many as possible of the following seeds:

oats	dried beans	acorns
wheat	dried peas	pine cones
barley	pumpkin	walnuts
rye	squash	hazelnuts
corn	melon	beechnuts
buckwheat	apple pips	chestnuts
millet	peach stones	peanuts
sunflower	plum stones	maple seeds

Mount each kind of seed on a large sheet of Bristol board. Write the name of each seed below it. Use the display to encourage the children to learn to recognize the different seeds. Cover the names of seeds and ask children if they can identify particular seeds.

5. Farmers' Helpers

After a very heavy rain we often see earthworms on the surface of the ground. Use such an occurrence to arouse the children's curiosity about earthworms. Ask them if they know that earthworms are one of the farmer's best friends. Tell the children that as soil passes through the bodies of earthworms, plant matter and other rich substances from deep layers of soil are brought to the surface. Demonstrate how tunnels made by the earthworms allow air and water to circulate through the soil and enable the farmer's crops to grow better.

Try to collect about twenty earthworms in a shallow pan containing moist soil to a depth of about 5 cm. On one side of the pan, spread some coffee grounds; on the other side, spread some vegetable parings. Place the pan, covered with a damp

cloth, in a dark place in the classroom. At the end of one week, have the children observe what has happened to the surface of the soil.

6. To Hoe or not to Hoe

This experiment will help to demonstrate that even though earthworms help to loosen the soil, the farmer must still use machinery and implements to keep the soil porous so that water and nutrients will be available for the roots of plants.

You will need a soda cracker, a piece of bread of the same size as the cracker, and a dish with about 2 cm of water colored with food coloring. Place the cracker and the bread vertically in the water. Have the children observe that the water is absorbed more readily by the bread. This shows that soft porous soil absorbs water more readily for the use of plants.

SOCIAL STUDIES ACTIVITIES

1. Kinds of Farming

In order to make the children understand that there are several kinds of farms and that farming is now considered a business or an industry, introduce the children to some of the ideas suggested below. Use films, pictures, and books to illustrate the ideas and to make the discussion as appealing as possible.

Mixed Farming

- This is the traditional kind of farming.
- The farmer supports the family mainly from what is produced on the farm.
- Different kinds of animals are kept and several kinds of crops are grown to feed the animals.
- The farmer often requires help for harvesting and shares farm equipment with neighbors.

Specialized Farming

- One kind of animal is raised (chickens, hogs, dairy cattle, beef cattle) or one kind of crop is grown (tobacco, wheat, corn).
- The farmer uses machines to feed and to clean the animals or to plant and to harvest the crop.
- The farmer must keep up-to-date on new methods and machines.

2. Lifestyles of Farmers

With the decline of farms that provided only for the farmer and the family there has been a change in the lifestyle of a farmer. A farmer may

- live and work on the farm only;
- work the farm and have another job as well;
- live on the farm but have someone else work it while the farmer works elsewhere;
- live elsewhere and travel to the farm daily or weekly to work it.

Introduce these ideas to the children so that they may see the lifestyles available to a present-day farmer.

3. Protecting Our Resources

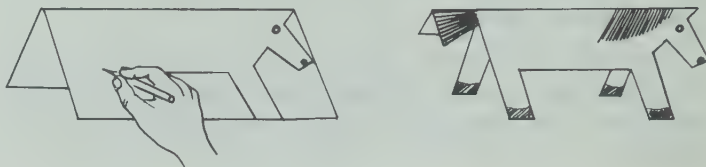
We have come to realize that our natural resources, such as soil, water, wildlife, forests, and oil are very valuable and must be treated wisely.

Have the children work together in small groups to make a booklet on "Conservation". Encourage the children to make drawings and to collect stories and pictures from newspapers and magazines to make the booklet a useful reference.

ART ACTIVITIES

1. Stand-up Animals

Have each child choose a farm animal and a sheet of construction paper. Ask each child to fold the paper in half and to draw an animal so that its head and part of its body are on the fold. When each animal is cut out it will stand up. Incorporate these animals into a scene for the farm display.



2. Box Sculpture

Collect small cardboard boxes and containers and have the children use them to create farm machinery and vehicles. These may be painted and placed in the farm scene with the animals.

3. Model Farm

If the children are interested in the idea of a farm, encourage them to build a model of a farm. A child who owns a cardboard model of a farm might like to loan it as a basis for this project. The activities possible for this project are limited only by the imagination of the children. The following suggestions will lead to others, depending on the interests of the children.

- Make Plasticine models of farm animals, farm machinery, and tools.
- Use sand to make models of fields.
- Draw, color, and cut out plants for the vegetable garden and the flower garden.
- Make a scarecrow for the vegetable garden.
- Build a fence around the farm using toothpicks or popsicle sticks.

MOVEMENT ACTIVITIES

1. Animal Walk

Ask the children to demonstrate how various farm animals walk. Discuss whether the animals can be classified as fast-moving or slow-moving animals. When the children have an idea of how each animal moves, call the names of farm animals in succession. Have the children change their method of movement as each new animal is mentioned.

2. Dance a Story

Tell a story of planting, cultivating, and harvesting a crop, for example, corn. Ask the children to suggest the movements involved. Tell the story again and have the children act out the various movements involved in the three stages.

MUSIC ACTIVITIES

1. Farm Sounds

Continue collecting sounds as you did for the theme about school. This time the sounds must be peculiar to the farm. Animal sounds and the sounds of different machines can be taped from films and records if it is not possible to visit a farm. You may wish to have the children illustrate and identify the sounds in a book entitled "Farm Sounds".

Complete.

Unit 8

Page 149

LESSON OUTCOME

Write standard numerals and expanded-form numerals for the numbers from 10 to 19

Materials

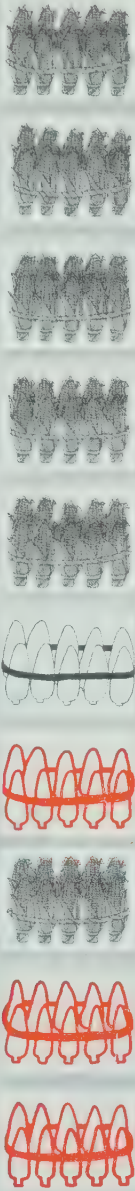
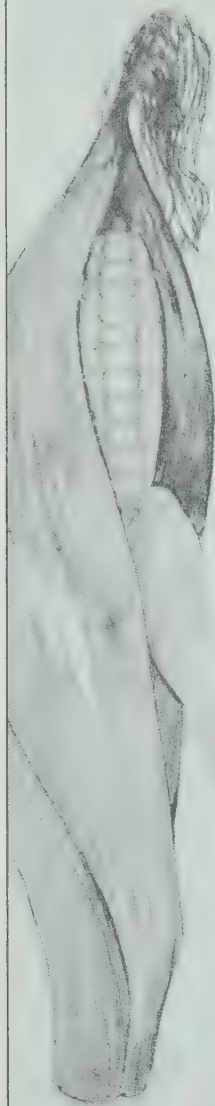
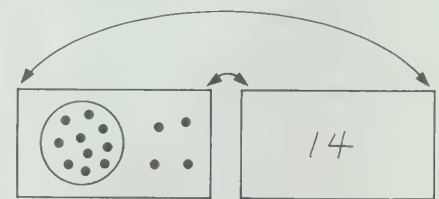
objects suitable for grouping in tens, numeral cards for 10 to 19, nine index cards for each child

Vocabulary

number names *eleven to nineteen*

RELATED ACTIVITIES

• Give each child nine index cards and have the children make number concept cards for the numbers 11 to 19. On one side of each card, have the children draw a group of ten objects and the required number of single objects. On the other side of the card, have the children print the corresponding numeral. These cards will be used in subsequent lessons.



| ten and zero 10

| ten and one 11

| ten and two 12

| ten and 3 13

| ten and 4 14

| ten and 5 15

| ten and 6 16

| ten and 7 17

| ten and 8 18

| ten and 9 19
(one hundred forty-nine) 149

Introduction to the numbers 11 to 19

LESSON ACTIVITY

Before Using the Page

• Display twelve objects. Have a child make a bundle of ten. Ask how many groups of ten there are and how many more. Display eleven objects and have a child make a bundle of ten. Ask how many groups of ten there are and how many more. Display ten objects and have a child make a bundle of ten. Ask how many groups of ten there are and how many more. Explain that there is one ten and zero single objects. Display a group of ten and the numeral card for 10. Explain that the numeral means "one group of ten and no more". Display a group of ten and one single object. Say, "I have one ten and one." Show the numeral card for 11. Have a child state that the numeral means "one group of ten and one more". Continue this procedure for the numbers 12 to 19. Emphasize the "one group of ten and _____ more" each time.

You may wish to delay mentioning the names *eleven to nineteen* until the next lesson. However, if many of the children know the words, introduce them in this lesson.

• Play the game "I'm Thinking of a Number". Say, "I'm thinking of one ten and two more." Have a child print 12 on the chalkboard, point to the 1 and the 2, in turn, and say, "One ten and two more". When a child's response is correct, he / she may be the leader by saying, "I'm thinking of one ten and _____ more." Continue the game until each child in the group has had a turn.

Using the Page

• Give each child nineteen of the objects that you are using for making groups of ten. Have the children use these when they are completing the exercises.

Ask the children to look at the first exercise. Ask how many bundles of corn there are and how many single ears of corn there are. Ask a child to read the words at the right.

As the children complete each exercise, ask them to check that each bundle contains 10 ears. Ask them to read the words silently and then record the corresponding numerals. For each of 16, 18, and 19, have the children sketch a bundle of ten and the single ears.

LESSON OUTCOME

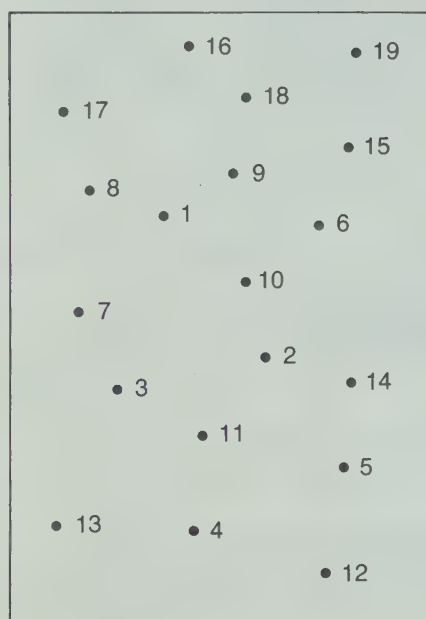
Read and write the numerals in sequence to 19

Materials

number concept cards from 11 to 19 for each child, objects for grouping in tens, a set of numeral cards for 1 to 19

RELATED ACTIVITIES

- You may wish to extend the number trays for the numbers zero to ten to include trays for the numbers eleven to nineteen.
- Prepare a work sheet on which the numerals from 1 to 19 are shown beside randomly placed dots. Have the children join the dots in order.



Complete.

10
9
8
7
6
5
4
3
2
1

1 ten and 6 16
1 ten and 2 12
1 ten and 0 10
1 ten and 3 13
1 ten and 5 15
1 ten and 9 19
1 ten and 1 11
1 ten and 8 18
1 ten and 4 14
1 ten and 7 17

11
12
13
14
15
16
17
18
19

10 11 12 13 14 15 16 17 18

12 13 14 15 16 17 18 19

4 5 6 7 8 9 10 11 12

150 (one hundred fifty)

Understanding the order of the numbers to 19

Print the missing numerals.

LESSON ACTIVITY

Before Using the Page

Each child should have a set of the number concept cards suggested in *Related Activities* on page T197. If you did not introduce the number names in the last lesson do so now. Display one group of ten and one single object. Have the children hold up their number concept cards that show the corresponding numeral (11). Introduce (or review) the word *eleven*. Repeat the procedure for "one ten and two more" and introduce (or review) the word *twelve*. Continue the procedure for the numbers 13 to 19 and introduce (or review) the words *fourteen* to *nineteen*.

Continue to display one group of ten and single objects and have the children show the appropriate cards. In each case, ask a child to state the corresponding word.

Give a numeral card showing from 1 to 19 at random to each of nineteen children. Have them hold the cards in front of them and form a row along one side of the classroom so that the numbers are in order. Have each child, in turn, say, "I am one," "I am two," "I am three," and so on.

When the children are in line, start with the child holding the card showing 2 and have children skip count by twos to obtain the even numbers. Ask these children to take one step forward, in turn, and say, "I am two," "I am four," "I am six," and so on. Then ask the children holding the cards for the odd numbers to take two steps forward and say, "I am one," "I am three," "I am five," and so on.

Using the Page

Ask the children to read in order the numerals shown on the trees. Then have them write the standard numerals in the outline of the house.

For the second part of the page, have the children complete the three sequences of numbers.

After the children have completed the page, you may wish to have them ring the even numbers in the first sequence at the bottom of the page by skip counting by twos from 10 and use a check to mark the odd numbers in the second sequence by skip counting by twos from 13.

Complete.

10 and one more is 11

11 and one more is 12

12 and one more is 13

13 and one more is 14

14 and one more is 15

15 and one more is 16

16 and one more is 17

17 and one more is 18

18 and one more is 19

$$10 + 0 = \underline{10}$$

$$10 + 1 = \underline{11}$$

$$10 + 2 = \underline{12}$$

$$10 + 3 = \underline{13}$$

$$10 + 4 = \underline{14}$$

What number comes after ?

14 15

12 13

11 12

16 17

15 16

10 11

18 19

17 18

What number comes before ?

16 17

10 11

11 12

17 18

18 19

13 14

15 16

14 15

Extending the numbers to 19 by adding one more

(one hundred fifty-one) 151

LESSON OUTCOME

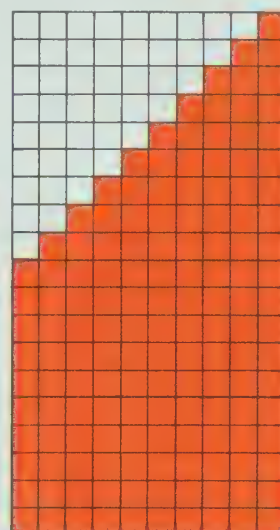
Demonstrate an understanding of the numbers from 10 to 19

Materials

display board, square shapes, strips of ten squares, objects for grouping, numeral cards for 10 to 19

RELATED ACTIVITIES

- If you have Unifix cubes, ask the children to make "trains" for the numbers from 0 to 19 and then place them in order.
- Have the children color inside squares on graph paper to represent the numbers from 10 to 19. Have them color red all the groups of ten, and color blue all the single squares so that the buildup of the numbers by one can be seen easily.



LESSON ACTIVITY

Before Using the Page

- Place one square shape on the display board and ask how many there are. Include one more square shape and have a child say, "One and one more are two." Continue until there are ten square shapes on display. Replace the ten single square shapes with a strip of ten squares. Include one more square shape each time and ask how many there are, until you have one strip and nine single square shapes. Ask children to tell how many there are each time and to state the corresponding number name, for example, "one ten and five" and "fifteen".
- Have the children say in unison the number names *ten* to *nineteen*.
- Display a bundle of ten objects and one single object. Say, "I have ten and one more." Print "ten and one more" on the chalkboard. Ask if anyone can think of and show a shorter way of writing the phrase on the chalkboard. If the response is "10 + 1", ask if there is a shorter way of writing "10 + 1" and have a child show it on the chalkboard. If the response is

"11", ask what the name of the number is (eleven). Repeat this procedure for the other numbers to 19.

- Give a numeral card for 10 to 19 to each of ten children. Ask them to stand in order at the front of the classroom. Ask questions such as the following:
 - "What number comes after 11?"
 - "What number comes before 13?"
 - "What number comes between 15 and 17?"
 - "What number comes after 13 and before 15?"

Using the Page

- Discuss with the children what they are to do for each part of the page. Then let the children work independently. Observe the children while they work and give help to those who are having difficulty. Some children may need to refer to the number line for help in completing the exercises at the bottom of the page.

LESSON OUTCOME

Use 10 and the numbers 0 to 9 as addends

Materials

objects for grouping in tens, two cans

Vocabulary

tens' holder, ones' holder

RELATED ACTIVITIES

- You may wish to have groups of four children play the game "Teen Numbers" described on page T219.
- If you have not already done so, this would be an ideal time to introduce the concept of *right* and *left* to the children. Have each child shake hands with another child or with you. Then ask the children to raise the hand they used to shake hands. Tell the children that the hand they use to shake hands is the *right* hand, and the other hand is the *left* hand. As certain tasks are performed throughout the day, describe them using "right hand" or "left hand"; for example, "I used my right hand to open the door." Knowing these concepts will help to prepare the children for the concept of *ones* and *tens* because the ones' place can be associated with the right hand, and the tens' place with the left hand.

Complete.

$10 + 0 = 10$

$10 + 1 = 11$

$10 + 2 = 12$

$10 + 3 = 13$

$10 + 4 = 14$

$10 + 5 = 15$

$10 + 6 = 16$

$10 + 7 = 17$

$10 + 8 = 18$

$10 + 9 = 19$

$9 + 10 = 19$

$8 + 10 = 18$

$7 + 10 = 17$

$6 + 10 = 16$

$5 + 10 = 15$

$4 + 10 = 14$

$3 + 10 = 13$

$2 + 10 = 12$

$1 + 10 = 11$

$0 + 10 = 10$

$10 + 5 = 15$

$10 + 2 = 12$

$10 + 7 = 17$

$10 + 4 = 14$

$10 + 1 = 11$

$10 + 3 = 13$

$6 + 10 = 16$

$0 + 10 = 10$

$8 + 10 = 18$

$5 + 10 = 15$

$2 + 10 = 12$

$9 + 10 = 19$

152 (one hundred fifty-two)

Using 10 and the numbers 0 to 9 as addends

LESSON ACTIVITY

Before Using the Page

- Now that the children have had some work with two-place numerals you may wish to introduce and use the words *tens* and *ones* in preparation for the lessons in Unit 9.

Display two cans, one labelled *tens* and the other labelled *ones*. Place three bundles of ten in the tens' can. Ask how many groups of ten there are in the can. Point to the label and say that because this can is for one ten, two tens, and so on, it is to be called the *tens' holder*. Place two single objects in the ones' can. Ask how many objects there are in the can. Point to the label and say that because there are single objects in the can it is to be called the *ones' holder*. Place the two cans side by side with the tens' holder to the left of the ones' holder when the children view them.

- Ask a child to place 1 ten and 4 ones in the correct holders. Write $10 + 4$ on the chalkboard. Have a child state how many objects there are altogether in the two holders and complete the addition sentence. Repeat the procedure for the other numbers from 10 to 19.

Empty the holders. Place 1 ten in the tens' holder. Write the addition sentence $10 + \underline{\quad} = 15$ on the chalkboard. Ask how many there should be in the two holders together and how many should be placed in the ones' holder. Have a child place the 5 ones in the holder and complete the addition sentence. Repeat several times for other addition sentences. Then adapt the activity for sentences in the form $\underline{\quad} + 10 = 13$.

Using the Page

- Have children complete the addition sentences on the first part of the page. As they record their answers they will see the sums increasing in the left column and decreasing in the right column.
- In the exercises for the second part of the page, there are missing addends in the addition sentences. The children should have little difficulty with these, especially when the pattern has been established by the answers for the first part of the page.

Let the children work independently on the page and provide help for those who are having difficulty.

LESSON OUTCOME

Use the number line for comparing numbers, to 19

Materials

number line

RELATED ACTIVITIES

- Draw a number line on adding machine tape to be permanently displayed on one wall of the classroom. Place it low enough for the children to refer to with number strips, if necessary. Mark equally spaced dots to accommodate the numerals from 0 to 100. Have the children print or paste the numerals from 0 to 19 on the number line at this time. You can use this number line in Unit 9 for numbers greater than 19.
- Give each child a sheet of paper on which there are two columns labelled "Yes" and "No". Start by saying, "Is 12 greater than 9?" Have the children mark a check in the proper column.

	Yes	No
1	✓	
2		✓
3		✓
4	✓	

Continue with other questions similar to these:

"Is 8 less than 7?"

"Does 12 come after 14?"

"Does 16 come before 18?"



What number comes before ?

18 19 11 12 10 11 17 18 15 16
16 17 14 15 12 13 13 14 9 10

What number comes after ?

17 18 11 12 15 16 16 17 12 13
13 14 14 15 18 19 10 11 9 10

12 comes before 13

13 comes after 12

12 is less than 13

13 is greater than 12

15 comes before 16

11 comes after 10

15 is less than 16

11 is greater than 10

Ring.

13 is less than 17
greater than

18 is less than 12
greater than

14 is less than 11
greater than

15 is less than 19
greater than

12 is less than 15
greater than

16 is less than 13
greater than

Comparing numbers, to 19

(one hundred fifty-three) 153

LESSON ACTIVITY

Before Using the Page

- On the chalkboard, draw a number line for the numbers from 0 to 19. Point to each of several numerals in turn and ask for the name of the corresponding number. For example, if you point to 18, the response should be "eighteen". Ask the children to explain what each of the numerals represents; for example, 16 represents "one ten and six ones".

Ask questions similar to the following for the numbers to nine: "What number comes after 4?" "What number comes before 8?" "What number comes between 5 and 7?" Then repeat the same type of questions for the numbers 10 to 19.

- Ask questions about numbers greater than or less than nine. Remind the children that when you count forward on the number line the numbers become greater, and when you count backward on the number line the numbers become less. Ask questions similar to the following: "Is 5 greater than 3?" "Is 6 less than 7?" "Is 2 greater than or less than 4?" Then repeat the same type of questions for the numbers 10 to 19.

- Point to the number line and have one child name two numbers that are greater than 14. Ask another child to name two other numbers that are greater than 14. Repeat with other numbers.
- Ask one child to name two numbers that are less than 11. Ask another child to name two other numbers that are less than 11. Continue until all the numbers have been chosen.

Using the Page

- Read the words with the children to make sure that they recognize the phrases "comes before", "comes after", "less than", and "greater than". Then let the children work independently.

LESSON OUTCOME

Recognize values of sets of coins for amounts from 10 cents to 19 cents

Materials

real money, play money, or coin cutouts from copies of page T337, objects with tags showing prices from 10¢ to 19¢

RELATED ACTIVITIES

- Prepare a set of cards showing pictures of small toys marked with prices to 19 cents. On the back of each card, show coin cutouts from copies of page T337 for the coins needed to “buy” the toy. Have the children use these cards for playing “store”. The children can indicate to the “storekeeper” the cards showing the toys they wish to buy. Each child gives the storekeeper the coins necessary to buy the toy. The storekeeper can check the back of the card to see whether the correct coins have been given. You may wish to include items with tags showing prices from 20¢ to 90¢ to review counting by tens.

How much ?

15 ¢

18 ¢

12 ¢

17 ¢

14 ¢

16 ¢

Complete.

1 dime and 9 pennies = 19 ¢

1 dime and 1 penny = 11 ¢

13 ¢ = 1 dime and 3 pennies

15 ¢ = 1 dime and 5 pennies

154 (one hundred fifty-four)

Working with dimes and pennies

LESSON ACTIVITY

Before Using the Page

- Display a set of nine pennies and then include one more. Ask how many pennies there are. Ask what coin can replace the ten pennies. Replace the ten pennies with a dime. Include one more penny and ask the value of the two coins (11 cents). Include one more penny each time until the value of the coins is 19 cents. Write the words *dime*, *penny*, and *pennies* on the chalkboard.
- Display a dime and several pennies. Ask a child to state the value of the coins in cents. Repeat several times.
- Have children, in turn, take ten pennies from a supply of pennies and bring them to you in exchange for one dime. After each child has exchanged ten pennies for one dime, give each child from one to nine pennies so that he / she will have coins worth from 10 cents to 19 cents.

Display an item with a price tag showing 16¢. The child whose set of coins is worth 16 cents may “buy” the item. When the child “pays” for the item, he / she says, “One dime

and six pennies make 16 cents.” Repeat with other items showing various prices to 19 cents.

- You may wish to review counting by tens to ninety at this time. If so, display four dimes. Ask how many dimes there are and the value of a dime in cents. Have a child find the value of the coins by pointing to each dime in turn and saying, “Ten, twenty, thirty, forty; forty cents”. Repeat several times with other sets of dimes.

Using the Page

- Have the children record the value of each of the four sets of coins. For the peas and the potato, have them draw the dimes and pennies that have the values given, for example, (10¢)(1¢)(1¢) for 12¢. You may prefer to give the children copies of page T337 (dimes and pennies only) and have them paste the appropriate coin cutouts on the page.

Make sure that the children can read the words “dime” and “pennies” at the bottom of the page. Then have them complete the four exercises.

LESSON OUTCOME

Complete related basic addition and subtraction facts, sums to 4

Materials

display board and cutouts

Vocabulary

related facts

RELATED ACTIVITIES

- Have the children make pages for a "Book of Facts". For this lesson, they can make the pages for sums of 1, 2, and 3.

$0 + 1 = 1$	$1 - 1 = 0$
$1 + 0 = 1$	$1 - 0 = 1$

$0 + 2 = 2$	$2 - 2 = 0$
$1 + 1 = 2$	$2 - 1 = 1$
$2 + 0 = 2$	$2 - 0 = 2$

$0 + 3 = 3$	$3 - 3 = 0$
$1 + 2 = 3$	$3 - 2 = 1$
$2 + 1 = 3$	$3 - 1 = 2$
$3 + 0 = 3$	$3 - 0 = 3$

Complete.

Introduction to related addition and subtraction facts

(one hundred fifty-five) 155

LESSON ACTIVITY

Before Using the Page

• Review the idea that changing the order of two addends does not affect their sum. (See page T116.) Ask three children to stand at the front of the classroom. Ask two children to join them. Have one child state the addition sentence that describes the action ($3 + 2 = 5$). Have another child write the addition sentence on the chalkboard. Reverse the roles of the two groups; that is, ask the three children to join the two children. Have a child state the addition sentence that describes the action ($2 + 3 = 5$). Have another child write the sentence below the first one on the chalkboard.

Ask the original groups of three and two children to stand together to form a group of five. Ask the two children to leave the group. Have one child state the subtraction sentence that describes the action ($5 - 2 = 3$). Have another child write the sentence beside the first addition sentence on the chalkboard. By questioning, lead the children to understand that in the joining (additive) action the two children came to the three

children, and in the separating (subtractive) action the two children went away and three children remained.

Complete the set of facts by asking the three children to leave the group and write the subtraction sentence ($5 - 3 = 2$). Now, four facts, two for addition and two for subtraction, can be seen to be related.

$$\begin{array}{ll} 3 + 2 = 5 & 5 - 2 = 3 \\ 2 + 3 = 5 & 5 - 3 = 2 \end{array}$$

Have other groups of children demonstrate $1 + 3$, $4 - 3$, $3 + 1$, $4 - 1$, and also $2 + 2$ and $4 - 2$.

Using the Page

• Direct the children's attention to the horses on the first patch of grass. Ask how many horses there are. Ask how many horses are coming to join the two horses. Have the children complete the first addition sentence.

Ask how many horses there are altogether in the picture at the right. Ask how many horses are going away and how many horses there are on the patch of grass. Have the children complete the subtraction sentence. Then let the children continue on their own.

LESSON OUTCOME

Complete related basic addition and subtraction facts, sums to 5

Materials

display board and cutouts, string or yarn, a card marked to show a set of five partitioned into groups of one and four

RELATED ACTIVITIES

- Give each child a slip of paper on which there are three numbers such that the third number is the sum of the first two, for example, 1, 3, and 4. Have the children write the four (or two) related addition and subtraction sentences.
- Have the children make pages for sums of 4 and 5 for their "Book of Facts".

$0 + 4 = 4$	$4 - 4 = 0$
$1 + 3 = 4$	$4 - 3 = 1$
$2 + 2 = 4$	$4 - 2 = 2$
$3 + 1 = 4$	$4 - 1 = 3$
$4 + 0 = 4$	$4 - 0 = 4$

$0 + 5 = 5$	$5 - 5 = 0$
$1 + 4 = 5$	$5 - 4 = 1$
$2 + 3 = 5$	$5 - 3 = 2$
$3 + 2 = 5$	$5 - 2 = 3$
$4 + 1 = 5$	$5 - 1 = 4$
$5 + 0 = 5$	$5 - 0 = 5$

Complete.



$0 + 3 = 3$

$3 - 3 = 0$

$3 + 0 = 3$

$3 - 0 = 3$

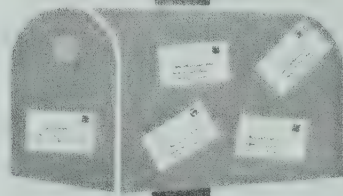


$1 + 3 = 4$

$4 - 3 = 1$

$3 + 1 = 4$

$4 - 1 = 3$



$1 + 4 = 5$

$5 - 4 = 1$

$4 + 1 = 5$

$5 - 1 = 4$



$0 + 5 = 5$

$5 - 5 = 0$

$5 + 0 = 5$

$5 - 0 = 5$



$2 + 3 = 5$

$5 - 3 = 2$

$3 + 2 = 5$

$5 - 2 = 3$

156 (one hundred fifty-six)

Relating addition and subtraction facts, sums to 5

LESSON ACTIVITY

Before Using the Page

- Place one cutout on the display board and then place two more to make a set of three. Ask a child to state the addition sentence that describes the action ($1 + 2 = 3$) and to write it on the chalkboard. Remove the two objects and ask a child to state the subtraction sentence that describes the action ($3 - 2 = 1$) and to write it on the chalkboard. Continue until the sentences $2 + 1 = 3$ and $3 - 1 = 2$ have been included. Repeat the procedure for the addends 1 and 4 and also 2 and 2.
- Place a set of four cutouts on the display board. Have children use a piece of string or yarn to partition the set to illustrate the family of facts for each pair of addends (1 and 3, 2 and 2, 0 and 4). Have the children write the sentences on the chalkboard.

Repeat the procedure for a set of five cutouts.

- Demonstrate how a card showing a partitioned set can be used to derive a family of related facts. Display a card marked as shown (A). Lead the children to suggest the related sen-

tences shown. Then turn the card around (B) and lead the children to suggest two more related sentences.



$1 + 4 = 5$

$5 - 4 = 1$

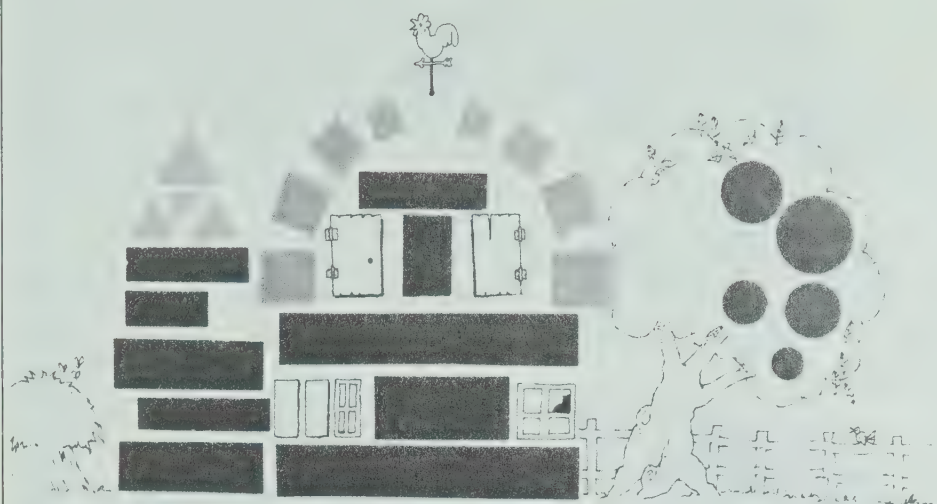


$4 + 1 = 5$

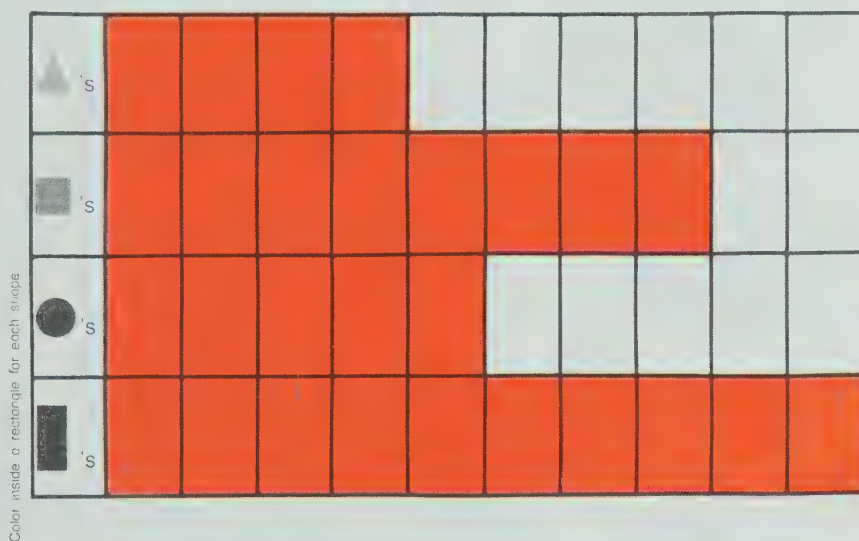
$5 - 1 = 4$

Using the Page

- Ask the children to look at the first mailbox. Tell them that the picture illustrates the first addition sentence shown. Have the children complete the sentence. Ask the children to turn the picture around in their minds to "see" the second addition sentence. Have the children complete that addition sentence. Ask children to explain the subtraction sentences in terms of the letters. Then let the children work independently.
- After the children have completed the exercises, you may wish to state an addition sentence and have children read the related addition sentence. Follow a similar procedure for subtraction sentences.



How many ?



Graphing

(one hundred fifty-seven) 157

LESSON OUTCOME

Use information to make a bar graph;
interpret a bar graph

Materials

flash cards having the shapes of
triangles, squares, rectangles, and
circles, crayons for each child

RELATED ACTIVITIES

• Place a large sheet of graph paper at the front of the classroom. Have each child color inside one square for the predominant color that he / she is wearing – red, blue, yellow, and so on. There should be a row for each color. When all the children have been represented, have them study the graph and make up questions for other children to answer.

“What is the most popular color worn today?”

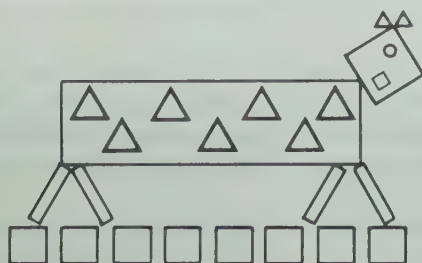
“What is the least popular color worn today?”

“How many more children are wearing (red) than (green)?”

“Of the colors (blue) and (green), which was chosen more (fewer) times?”

LESSON ACTIVITY**Before Using the Page**

- Display flash cards having the shapes of triangles, squares, rectangles, and circles. Ask the children to identify the shapes and to tell in what ways pairs of shapes are alike and in what ways they are different.
- Have children help to draw a picture on the chalkboard or prepare a picture from cutouts composed of the four basic shapes. Ask the children to count how many there are of each kind of shape in the picture.



1 circle
5 rectangles
9 triangles
10 squares

Using the Page

- Discuss the picture with the children. Ask them how many different kinds of shapes are colored in the picture. Have the children count how many of each kind of shape are shown in the picture and color inside that number of rectangles to make a horizontal bar graph.
- After the children have completed the graph, have them refer to the graph to answer questions similar to the following:
 - “Of which shape are there the most?”
 - “Of which shape are there the fewest?”
 - “How many circular shapes are there?”
 - “How many triangular shapes are there?”
 - “How many more rectangular shapes than square shapes are there?”
 - “How many fewer triangular shapes than circular shapes are there?”
 - “How many more yellow shapes than blue shapes are there?”
 - “How many fewer green shapes than yellow shapes are there?”

LESSON OUTCOME

Complete related basic addition and subtraction facts, sums of 5 and 6

Materials

display board and cutouts, string or yarn

RELATED ACTIVITIES

- Have the children use dominoes or domino cards to suggest basic facts to be written in number sentences. For example,



suggests $1 + 4 = 5$ and $5 - 4 = 1$. When turned around it suggests $4 + 1 = 5$ and $5 - 1 = 4$. (Remove the dominoes or domino cards that suggest sums of 7 to 12.)

Complete.

$2 + 4 = \underline{6}$	$6 - 4 = \underline{2}$
$4 + 2 = \underline{6}$	$6 - 2 = \underline{4}$
$5 + 1 = \underline{6}$	$6 - 1 = \underline{5}$
$1 + 5 = \underline{6}$	$6 - 5 = \underline{1}$
$6 + 0 = \underline{6}$	$6 - 0 = \underline{6}$
$0 + 6 = \underline{6}$	$6 - 6 = \underline{0}$
$3 + 3 = \underline{6}$	$6 - 3 = \underline{3}$
$2 + 3 = \underline{5}$	$5 - 3 = \underline{2}$
$3 + 2 = \underline{5}$	$5 - 2 = \underline{3}$

158 (one hundred fifty-eight)

Relating addition and subtraction facts, sums of 5 and 6

LESSON ACTIVITY

Before Using the Page

- Place four cutouts on the display board and then include one more to make a set of five. Have children state and write the four related addition and subtraction sentences ($4 + 1 = 5$, $5 - 1 = 4$, $1 + 4 = 5$, $5 - 4 = 1$).
- Place six cutouts on the display board. Have a child move two of the cutouts away, state the corresponding subtraction sentence ($6 - 2 = 4$), and write it on the chalkboard. Have another child move the two cutouts back again, state the corresponding addition sentence ($4 + 2 = 6$), and write it on the chalkboard.

Use a similar procedure to derive the sentences $6 - 4 = 2$ and $2 + 4 = 6$.

- Place six cutouts on the display board. Have children use a piece of string or yarn to partition the set to illustrate the family of facts for each pair of addends. Have children write the corresponding sentences on the chalkboard.



$5 + 1 = 6$

$6 - 1 = 5$

$1 + 5 = 6$

$6 - 5 = 1$



$4 + 2 = 6$

$6 - 2 = 4$

$2 + 4 = 6$

$6 - 4 = 2$



$3 + 3 = 6$

$6 - 3 = 3$



$0 + 6 = 6$

$6 - 6 = 0$

$6 + 0 = 6$

$6 - 0 = 6$

Using the Page

- Ask children to describe what is happening in each of the four related pictures at the top of the page and then to complete the four related number sentences. Then let the children work independently.

For the last four related facts, have the children draw a set of five bugs and partition them to show two in one group and three in another group.

LESSON OUTCOME

Complete related basic addition and subtraction facts, sums to 6

Materials

display board and cutouts

RELATED ACTIVITIES

- Have each child select two numbers from 0 to 6 (by rolling two dice, using a spinner, drawing from a pack of cards, or naming two numbers at random). Have the children try to write four related addition and subtraction facts, considering the greater number as the sum. For 6 and 4, for example, they should write $6 - 4 = 2$, $2 + 4 = 6$, $4 + 2 = 6$, and $6 - 2 = 4$. For 3 and 3, they should write $3 - 3 = 0$, $0 + 3 = 3$, $3 + 0 = 3$, and $3 - 0 = 3$.
- Have the children make a page for sums of 6 for their "Book of Facts".

$0 + 6 = 6$	$6 - 6 = 0$
$1 + 5 = 6$	$6 - 5 = 1$
$2 + 4 = 6$	$6 - 4 = 2$
$3 + 3 = 6$	$6 - 3 = 3$
$4 + 2 = 6$	$6 - 2 = 4$
$5 + 1 = 6$	$6 - 1 = 5$
$6 + 0 = 6$	$6 - 0 = 6$

Complete.

3 + 1 = 4 4 - 1 = 3

1 + 3 = 4 4 - 3 = 1

2 + 3 = 5 5 - 3 = 2

3 + 2 = 5 5 - 2 = 3

1 + 5 = 6 6 - 5 = 1

5 + 1 = 6 6 - 1 = 5

4 + 1 = 5 5 - 1 = 4

1 + 4 = 5 5 - 4 = 1

2 + 4 = 6 6 - 4 = 2

4 + 2 = 6 6 - 2 = 4

1 + 1 = 2 2 - 1 = 1

2 + 2 = 4 4 - 2 = 2

3 + 3 = 6 6 - 3 = 3

Reviewing related addition and subtraction facts, sums to 6

(One hundred fifty-nine) 159

LESSON ACTIVITY

Before Using the Page

- Place two cutouts on the display board. Ask how many there are. Have a child place one more cutout beside the others. Ask a child to state the corresponding addition sentence ($2 + 1 = 3$). Write it on the chalkboard. Ask another child to change the order of the numbers and state the corresponding addition sentence ($1 + 2 = 3$). Write it below the first sentence on the chalkboard. Opposite $2 + 1 = 3$ write $3 - 1 = \underline{\quad}$. Have a child arrange the cutouts to illustrate the subtractive situation and complete the subtraction sentence. Opposite $1 + 2 = 3$ write $3 - \underline{\quad} = \underline{\quad}$. Have the children determine what numerals should be written to complete the subtraction sentence.
- Write the following sentences on the chalkboard, using colored chalk to emphasize the + 4 and the - 4, and the + 2 and the - 2.

$$\begin{array}{ll} 2 + 4 = 6 & 6 - 4 = 2 \\ 4 + 2 = \underline{\quad} & \underline{\quad} - 2 = \underline{\quad} \end{array}$$

Through manipulation of cutouts and discussion, have children complete the number sentences. Repeat the procedure for the related addition and subtraction facts for the numbers 5, 1, and 6.

Using the Page

- Direct the children's attention to the cans on the first shelf. Ask how many there are in the first group and how many there are in the second group. Ask how many there are altogether. Have the children trace over the dotted 4. Ask the children to think of the one can first and ask what addition sentence describes the situation. Have the children trace over the dotted 3 and then complete the addition sentence. Continue the discussion and have the children complete the two related subtraction sentences.

Direct the children's attention to the frying pans. Have the children draw a ring around all of them. Ask which addition facts describe the situation. Have the children write the two sums and then complete the two subtraction facts. Then let the children continue on their own.

OBJECTIVE

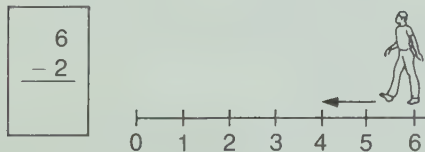
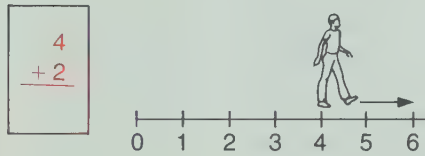
Complete basic addition and subtraction facts, sums and minuends to 10

Materials

display board and cutout in the shape of a child, number line, copies of page T336 (optional)

RELATED ACTIVITIES

- You may wish to provide children with tables cut from copies of page T338 for further practice with addition and subtraction.
- If you prepared the pocket chart described on page T191, children may work in pairs using the cards for sums and minuends to 6, to practise related facts. One child selects a card and illustrates the addition using counters, a drawing, or a number line. The other child turns the card over and illustrates the related fact.

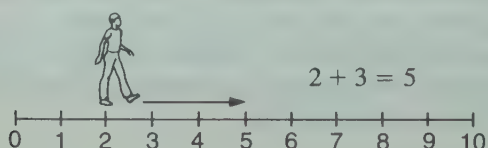


LESSON ACTIVITY

Before Using the Page

Some children may benefit by showing addition and subtraction on a number line. Show a number line from 0 to 10 on the display board and use a cutout in the shape of a child. Ask several children in turn to place the cutout above the dot for 3 on the number line, above the dot for 7, for 0, for 5, and so on.

Write $2 + 3 = \underline{\quad}$ on the chalkboard, point to the 2, and then place the cutout above 2 on the number line. Point to the symbol + and the 3 in the number sentence and move the cutout 3 "steps" forward as you say, "One, two, three." Ask what number is reached. Repeat the procedure slowly as you say, "Two plus three equals five." Complete the addition sentence on the chalkboard. Use several similar examples, having children move the cutout and state the addition sentence.



Complete.

+	1
6	7
7	8
8	9

+	3
3	6
5	8
7	10

+	6
0	6
2	8
4	10

+	4
1	5
6	10
5	9
3	7

+	7
1	8
0	7
2	9
3	10

+	5
5	10
1	6
3	8
4	9

-	1
1	0
5	4
10	9

-	8
10	2
9	1
8	0

-	4
6	2
8	4
10	6

-	3
10	7
4	1
8	5
7	4

-	6
9	3
7	1
6	0
8	2

-	2
6	4
9	7
4	2
7	5

160 (one hundred sixty)

Addition and subtraction practice: sums and minuends to 10

Adapt the above procedure for showing subtraction. For example, write $4 - 1 = \underline{\quad}$ on the chalkboard, point to the 4, and then place the cutout above 4 on the number line. Point to the symbol - and the 1 in the number sentence and move the cutout back 1 "step". Ask what number is reached and complete the subtraction sentence.

You may wish to give each child a number line cut from copies of page T336. Then children can move a finger on their number lines as the cutout is moved on the display board. Emphasize that the first number in the sentence names the starting point, that addition is shown by a move forward (to the right), and that subtraction is shown by a move backward (to the left).

Using the Page

- Discuss the first addition exercise and the first subtraction exercise. If children have been introduced to the number line, they may wish to use it to help in completing these exercises.

How are the shapes alike?

Each is a triangle.

Each
is
red.

Each has 4 sides.

Each is a rectangle.

Each is a square.

Each has 5 sides.

Make the shapes on a geoboard or geopaper and discuss how they are alike

Recognizing similarities in two-dimensional shapes

(one hundred sixty-one) 161

LESSON OUTCOME

Recognize similarities in two-dimensional shapes

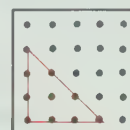
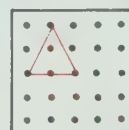
Materials

attribute blocks, geoboards, colored rubber bands, copies of page T332 or T333

RELATED ACTIVITIES

- You may wish to prepare cards covered with acetate for the children to use. Have them indicate the correct characteristic on the acetate, have their work checked, and then erase the marks so that other children can use the cards.

How are they alike?



Use a \checkmark .

color ☐

shape ☐

size ☐

number of sides ☐

LESSON ACTIVITY

Before Using the Page

- Use attribute blocks to play the game "Show Me". Place all the attribute blocks in front of the group and ask children in turn to participate according to instructions such as:

"Show me a triangular shape." (shape)

"Show me a blue shape." (color)

"Show me a large shape." (size)

"Show me a small red square shape." (size, color, shape)

- Display a red square shape and a blue square shape that are of the same size. Ask the children in what way they are alike (same shape and same size).

Display a red triangular shape and a red rectangular shape. Ask the children in what way they are alike (same color). Although color may seem to be the simplest common characteristic of two shapes, many children have difficulty identifying what appears obvious to adults.

Display a small red triangular shape and a small blue square shape. Ask the children in what way they are alike (both

small). You may have to ask leading questions before the children discover that the shapes are both small.

Display a small red rectangular shape and a large blue square shape. Ask the children in what way they are alike (each has four sides). Repeat with a small yellow triangular shape and a large red triangular shape.

Using the Page

- Read the question at the top of the page with the children. Discuss the two shapes on the first geoboard and ask in what way they are alike.

If you have geoboards for all the children in the group, have them make each pair of shapes in turn on their geoboards. If you do not have geoboards, have the children work on copies of page T332 or T333. After the children have made each pair of shapes, discuss their observations with them. Some children may have quite unexpected answers. One child may say, for example, "The shapes are alike because all their corners are square." If a child's answer is correct but not what you expected, accept the reasoning.

LESSON OUTCOME

Recognize differences in two-dimensional shapes

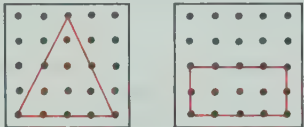
Materials

attribute blocks, geoboards, colored rubber bands, copies of page T332 or T333

RELATED ACTIVITIES

- You may wish to prepare cards covered with acetate as suggested on page T209.

How are they different?



Use an X.

color

☐

shape

☐

size

☐

number of sides

☐

How are the shapes different ?
Different sizes

Different shapes and numbers of sides

Different shapes

Different colors

Different shapes and numbers of sides

Different shapes, colors and numbers of sides

Make the shapes on a geoboard or geopaper and discuss how they are different.

LESSON ACTIVITY

Before Using the Page

- Using attribute blocks, display a red square shape and a yellow square shape that are of the same size. Ask the children in what way they are alike (same shape and same size). Ask in what way they are different (different colors).
- If children have difficulty understanding the meaning of the word “different”, say, “In what way are the shapes not the same?” Some children may respond more readily.
- Display a large red square shape and a large red triangular shape. Ask the children in what way they are different (different shapes).
- Display a large red rectangular shape and a small red rectangular shape. Ask the children in what way they are different (different sizes).
- Display a small red square shape and a small red triangular shape. Ask in what way they are different (different shapes and numbers of sides).
- If children have no difficulty identifying differences based

on color, shape, size, and number of sides, you may wish to continue with more difficult questions. It may be helpful to make a chart on the chalkboard and use a ✓ to indicate likenesses and an X to indicate differences.

	Shape	Color	Size	Number of sides
 	✓	✓	X	✓

Using the Page

- Read the question at the top of the page with the children. Discuss the two shapes on the first geoboard and ask in what way they are different.
- If you have geoboards for all the children in the group, have them make each pair of shapes in turn on their geoboards. If you do not have geoboards, have the children work on copies of page T332 or T333. After the children have made each pair of shapes, discuss their observations with them. Note that the pairs of shapes in the bottom row have two differences (shape and number of sides) and three differences (shape, color, and number of sides) respectively.

LESSON OUTCOME

Write a number sentence for a word problem

Materials

display board and cutouts

RELATED ACTIVITIES

- Ask children to think of a story problem and to draw pictures to illustrate it. Have as many children as possible tell their stories to the class (or to other children in a small group). Have the other children state the number sentence that describes each situation.
- Because the page suggests buying and selling things in a store, you may wish to review counting by tens to 90 and addition and subtraction facts with sums to 10 by involving the children in the play store.

Write the number sentences.

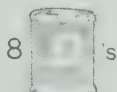


Add 4 more



How many 's in all ?

$$5 + 4 = 9$$



Sell 3



How many 's are left ?

$$8 - 3 = 5$$



Add 2 more



How many 's in all ?

$$6 + 2 = 8$$



Add 2 more



How many 's in all ?

$$7 + 2 = 9$$



Sell 3



How many 's are left ?

$$7 - 3 = 4$$



Sell 4



How many 's are left ?

$$9 - 4 = 5$$

Solving problems, sums and minuends to 9

(one hundred sixty-three) 163

LESSON ACTIVITY

Before Using the Page

- Display cutouts of two birds and four birds. Move the four birds toward the two birds and tell this story: "Susan saw two birds on a tree. Then four more birds came. How many birds did Susan see in all?" Ask the children to decide whether the action is a joining action or a separating action and what number sentence describes the situation ($2 + 4 = 6$). Have a child write the addition sentence on the chalkboard. Ask another child to answer the question in the story problem. The best response would be "There were six birds in all." Repeat the procedure using another set of cutouts and telling a story for a subtraction situation. Then present addition and subtraction situations at random.
- On the chalkboard, write a story such as the following:

5 's

2 more 's

How many 's in all?

Read the story aloud with the children. Have them discuss whether the action is a joining action or a separating action. Have them decide what number sentence will describe the situation ($5 + 2 = 7$). Ask one child to write the number sentence on the chalkboard. Ask another child to answer the question in the story problem. Repeat with other examples of additive and subtractive situations.

- You may wish to have children make up stories. Ask other children to identify the type of situation for each story and to state the corresponding number sentence.

Using the Page

- Direct the children's attention to the instruction at the top of the page. Read each problem with the children before they begin to work on the page. Let the children who can, work independently. Give help to those who are having difficulty.

LESSON OUTCOME

Apply the concept *how many more* in solving word problems

Materials

display board and cutouts, string or yarn, sets of ten or fewer objects in plastic bags, ten counters for each child

RELATED ACTIVITIES

- Shuffle cards showing the numerals 0 to 10 and deal two to each child.

Have the children draw a set of objects for each card, match the objects in the two sets to show which has more, and state how many more. Repeat several times.

If you wish, the children may work in pairs. The cards are placed face down in front of the children. Each child chooses one card and, without showing the card to the partner, draws a set to correspond to the number indicated. The two sets are matched and the child whose set has more, scores a point. The cards are replaced and reshuffled and the game continues. The player having the most points after six pairs of cards have been drawn is the winner. The children may also write the subtraction sentence each time they compare the numbers of their sets.

Complete.

Pat has 10.

Bob has 6.

Who has more? Bob (Pat)

$$10 - 6 = 4$$

How many more? 4

Pat has 7.

Bob has 4.

Who has more? Bob (Pat)

$$7 - 4 = 3$$

How many more? 3

Pat has 8.

Bob has 9.

Who has more? (Bob) Pat

$$9 - 8 = 1$$

How many more? 1

Bob has 9.

Pat has 4.

Who has more? (Bob) Pat

$$9 - 4 = 5$$

How many more? 5

Pat has 2.

Bob has 9.

Who has more? (Bob) Pat

$$9 - 2 = 7$$

How many more? 7

Bob has 5.

Pat has 10.

Who has more? Bob (Pat)

$$10 - 5 = 5$$

How many more? 5

Pat has 8.

Bob has 6.

Who has more? Bob (Pat)

$$8 - 6 = 2$$

How many more? 2

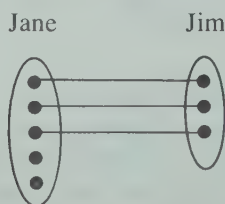
164 (one hundred sixty-four)

Reviewing the concept *how many more*

LESSON ACTIVITY

Before Using the Page

- Review the concept “how many more” on the display board. Give one child (Jane) five cutouts and another child (Jim) three cutouts. Ask Jane and Jim to place their sets on the display board. Ask, “Who has more cutouts?” The response should be “Jane has more.” Have Jim use string for matching the cutouts in the two sets.



$$5 - 3 = 2$$

When the matching is completed, ask one child how many more Jane has than Jim. Ask another child to state the subtraction sentence that tells “how many more” ($5 - 3 = 2$). Repeat the procedure using other sets of cutouts.

- Pass around a box in which there are small plastic bags containing ten or fewer objects. Ask each child to choose two bags. Have the children find how many objects there are in each bag and then state the subtraction sentence that tells “how many more” one bag has than the other. If you wish, each child may choose only one bag and work with a partner to compare the numbers of objects.

Using the Page

- Discuss the worked example with the children. Ask one child to identify Pat's set and another child to identify Bob's set. Read the words with the children and have the children trace over the symbols after answering the appropriate questions. Make sure that the children can continue on their own.

You may wish to provide the children with counters, or they could draw, for example, seven shapes after the statement “Pat has 7,” and four shapes after the statement “Bob has 4.”

OBJECTIVE

Complete basic addition and subtraction facts, sums and minuends to 10

Materials

flash cards for addition and subtraction facts having sums and minuends to 10, number concept cards for 0 to 10 for each child, dice or spinners marked from 1 to 6, crayons for each child

RELATED ACTIVITIES

- Prepare work sheets similar to the one shown. Of the five numbers named in each column, there is one that does not fit the pattern formed by the other four. Have the children add or subtract as indicated, determine the pattern, and cross out the one that does not belong. (In the first column, $4 + 4$ does not belong because the others are names for the number 9. In the second column, $3 + 0$ does not belong because the others form the pattern 10, 9, 8, 7. In the last column, $5 - 4$ does not fit the pattern 2, 4, 6, 8.)

$2 + 7$	$6 + 4$	$1 + 1$
$9 + 0$	$4 + 5$	$8 - 4$
$10 - 1$	$1 + 7$	$3 + 3$
$4 + 4$	$3 + 0$	$10 - 2$
$6 + 3$	$5 + 2$	$5 - 4$

Play the game.

$8 - 6$ 2	$3 + 3$ 6	$4 + 1$ 5	$10 - 6$ 4	$2 + 4$ 6	$10 - 7$ 3	$3 + 4$ 7 [STOP]
$5 + 2$ 7	$3 + 6$ 9	$4 + 4$ 8	$3 + 5$ 8	$6 + 2$ 8	$2 + 7$ 9	$4 + 0$ 4
$4 + 5$ 9	$7 + 1$ 8	$2 + 3$ 5	$6 + 0$ 6	$2 + 8$ 10	$5 + 4$ 9	$2 + 6$ 8
$10 - 2$ 8	$8 - 2$ 6	$7 - 3$ 4	$6 - 4$ 2	$2 + 5$ 7	$8 - 1$ 7	$4 + 6$ 10
$3 + 7$ 10	$4 + 2$ 6	$3 - 0$ 3	$6 - 3$ 3	$5 + 5$ 10	$8 - 4$ 4	$7 + 2$ 9
$7 - 5$ 2	$9 - 2$ 7	$4 + 3$ 7	$9 - 5$ 4	$7 - 6$ 1	$6 - 2$ 4	$8 - 3$ 5
$5 + 3$ 8	$7 - 4$ 3	$6 + 3$ 9	$7 - 2$ 5	$9 - 6$ 3	$5 - 1$ 4	$7 + 3$ 10
$10 - 4$ 6	$5 - 2$ 3	$8 + 2$ 10	$9 - 3$ 6	$10 - 5$ 5	$8 - 5$ 3	$9 - 7$ 2
$6 + 1$ 7 [GO]	$0 + 8$ 8	$9 - 4$ 5	$10 - 3$ 7	$6 + 4$ 10	$9 + 1$ 10	$2 + 2$ 4

Addition and subtraction practice: sums and minuends to 10 (one hundred sixty-five) 165

LESSON ACTIVITY

Before Using the Page

- Page 165 provides practice with addition and subtraction facts having sums and minuends to 10 in a game situation. You may wish to provide a quick review by displaying flash cards of addition and subtraction facts and having the children respond by holding up the numeral side of their number concept cards.

Using the Page

- This page can be used in a variety of ways. The following are two suggestions that you may wish to follow or adapt for your class.

1. The children may play the game independently. Each child will need a die or a spinner marked from 1 to 6. The child can begin at GO, write the answer for $6 + 1$, throw a die and advance the number of squares indicated, write the answer, and color the square a certain color. If each child is to complete 20 squares the first day, they can be colored red. If 20 squares are to be completed the second day, they

can be colored blue. The remaining squares can be completed on another occasion without the use of the die. If, on the second day, a throw of the die takes the player to a square that is already colored, the die is thrown again until the number tossed enables the player to move forward.

2. The children may work in pairs. They will need one die, one copy of page 165, and two differently colored crayons. The first player throws the die, advances, writes the answer, and colors the square. The partner then has a turn. The player with the most squares colored is the winner. A player who lands on a square already colored must wait until the next turn.

LESSON OUTCOME

Measure length using non-standard units

Materials

drinking straws, paper clips, sticks, paper strips of different lengths

Vocabulary



about

Background

- For page 117 the children used paper clips by placing them end to end or placing a single clip over and over. The length of each item was a whole number of paper clips. For page 166 the children have to measure lengths that are longer than or shorter than whole numbers of paper clips.

RELATED ACTIVITIES

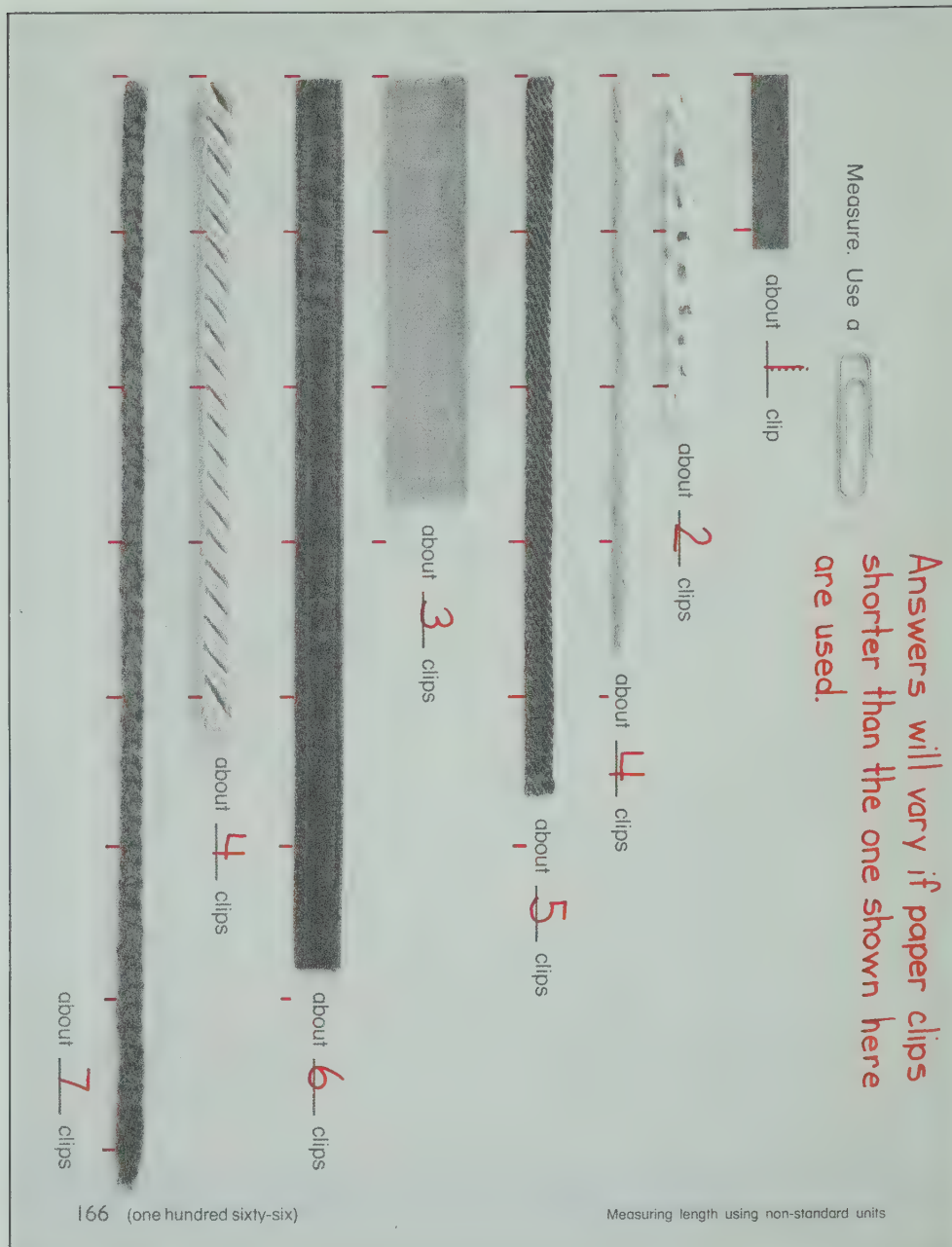
- Cut pieces of ribbon in about three different lengths. All pieces of the same color should be the same length. The children can use these to measure the same list of things. If you make cards showing two or three objects to be measured, the children can record the number of colored ribbons for the length of each object.

	Red	Yellow	Blue
	<u>8</u>	<u>12</u>	<u>15</u>
	_____	_____	_____

LESSON ACTIVITY

Before Using the Page

- Display a drinking straw and a paper clip. Ask children to describe how you could find how many paper clips long the straw is. Review the idea that one end of the paper clip must be aligned with one end of the straw. Tape several straws to a desk or a table and have children measure them using paper clips. You may wish to have them estimate before measuring. Have other children check their work.
- Draw a line segment on the chalkboard. Have two children use a straw to measure it. Have one child align the straw with one end of the line segment and the other child make a mark at the other end of the straw. Have them place the straw over and over until the remaining part to be measured is shorter than the straw. Discuss the fact that the line segment is longer than (5) straws but shorter than (6) straws. Ask if the remaining part can be considered almost a whole straw. If so, state that the line segment is "about (6) straws long". Repeat the procedure with different line segments.



Measure. Use a clip

about 1 clip

about 2 clips

about 4 clips

about 5 clips

about 6 clips

about 4 clips

about 7 clips

166 (one hundred sixty-six)

Measuring length using non-standard units

Answers will vary if paper clips shorter than the one shown here are used.

- Place several paper strips in various parts of the classroom. Give children straws, sticks, or other units to measure the strips. First have them guess about how long a strip is in the units they are using. Then have them measure the strips to the nearest unit.

Using the Page

- Have the children turn their books sideways. Read the words at the top of the page with the children. Have them place a paper clip on the red ribbon so that one end of the clip is aligned with the left end of the ribbon. Have them make a mark at each end of the paper clip. Ask whether the red ribbon is longer than or shorter than one paper clip. Have a child make the statement, "The red ribbon is about one paper clip long." Have the children trace over the dotted 1. Proceed in a similar way for the piece of knotted white string. Again, have a child make a concluding statement. Then let the children work independently. Remind the children to ask themselves whether a line segment is closer to (3) paper clips than it is to (4) paper clips. If so, their answer will be "about (3) paper clips".



3 o'clock



10 o'clock



6 o'clock



7 o'clock



4 o'clock



12 o'clock



1 o'clock



9 o'clock



5 o'clock



2 o'clock



8 o'clock



11 o'clock

Telling time, to the hour

(one hundred sixty-seven) 167

LESSON OUTCOME

Read and record time, to the hour

Materials

magazines, catalogues, demonstration clock, alarm clock

Vocabulary

time, clock, clock face, hour, o'clock

RELATED ACTIVITIES

- After the children have finished the page, have them state, in turn, the time shown on each clock face and ask them to suggest what they might be doing at that particular time in the morning, afternoon, or evening.
- Play the game "Time Bingo" with the whole class, or in small groups, as described on page T219.
- You may wish to read the poem "Clocks and Watches" on page T219.
- Have the children read the wall clock in the classroom when the time is 10 o'clock, 11 o'clock, 12 o'clock, and so on.

LESSON ACTIVITY

Before Using the Page

- Begin a discussion with the children to determine what they know about time; for example, when they get up in the morning, when they go to bed, when they have lunch, when their favorite television program begins.
- Have the children cut from magazines and catalogues as many different kinds of clocks as they can find. Paste these clocks on a chart and discuss the use of each one with the children. Ask the children to look at the faces of some of the dial clocks. Discuss what numerals there are on the face of a clock. Ask the children to look at the hands on the clocks and discuss in what way they are different (one is longer than the other). Explain that when the "long" hand is on 12, the "short" hand indicates the hour.
- Set the hour hand on your demonstration clock at 1 and the minute hand at 12. Ask to which numeral the "long" hand points and to which numeral the hour hand points. Say, "The clock shows 1 o'clock." Write "1 o'clock" on the chalk-

board. Move the hour hand from 1 to 2. Ask what time the clock shows now (2 o'clock). Write "2 o'clock" on the chalkboard. Repeat at random for every hour from 1 o'clock to 12 o'clock, and write "_____ o'clock" each time to reinforce recognition of the word *o'clock*.

- Discuss the hour as a unit of time. To give the children some idea of how long an hour is, set an alarm clock to ring in one hour. You may prefer to do this at the end of the lesson so that the children will not be waiting for the alarm to go off.

Using the Page

- Read the question at the top of the page with the children. Discuss the first clock face with them. Ask which hand is the hour hand and to which numeral it points. Ask which hand is the minute hand and to which numeral it points. Ask what time the clock shows. Have the children trace over the dotted 3. Discuss the second clock face in a similar way and then let the children continue on their own.

LESSON OUTCOME

Place the hands on a clock face to show a given hour

Materials

demonstration clock; a paper plate, cardboard hands, and a pronged metal fastener for each child

RELATED ACTIVITIES

- After the children have completed the page, discuss each clock face with them and have them tell, for example, how many hours 11 o'clock is after 8 o'clock, how many hours 12 o'clock is after 11 o'clock, how many hours 3 o'clock is before 5 o'clock, and so on.
- Prepare a work sheet of clock faces from copies of page T339. Show time, to the hour, on some of the clock faces. Write a time, to the hour, under each of the other clock faces. Have the children record the information required.
- When taking class trips, discuss the times involved; for example, "We left at 9 o'clock. We returned at 11 o'clock. We were gone two hours."
- Try to obtain mechanical clocks that are broken. Take some of these apart and let the children see the parts of a clock and explore some of the inner workings.

Draw the hands on the clock faces.



2 o'clock



8 o'clock



11 o'clock



12 o'clock



6 o'clock



10 o'clock



1 o'clock



3 o'clock



5 o'clock



4 o'clock



7 o'clock



9 o'clock

168 (one hundred sixty-eight)

Showing time, to the hour

LESSON ACTIVITY

Before Using the Page

- Sing the song on page T219 with the children.
- Review telling time, to the hour, by using the demonstration clock. Set the hands to show time, to the hour, for example, 4 o'clock. Ask a child to state the time shown. The response should be "The clock shows 4 o'clock." Repeat for each hour.
- Draw a big clock face on the chalkboard and indicate places for the twelve numerals. Have children print the numerals in the appropriate locations. Erase some of the numerals and have other children print the appropriate numerals.
- Give each child a paper plate on which you have marked the locations for the numerals around the rim. Have the children print the numerals from 1 to 12 on their clock faces. Give each child a "short" hand and a "long" hand cut from cardboard, and a metal fastener to attach the hands to the clock face. Help the children fasten the hands in place.

When the clock faces are ready, set your demonstration clock to show 9 o'clock. Ask the children to show 9 o'clock on

their clock faces. Repeat for 10 o'clock. As soon as the children have demonstrated their ability to set their clocks, play the game "Show Me". Say to the children, "Show me 5 o'clock." Ask the children to move the hands on their clock faces and then to hold them up for you to check at a glance. Repeat for each hour.

- On the chalkboard, draw a clock face with the hour hand missing. Ask which hand is missing. Ask to which numeral the "long" hand is pointing. Have a child draw the hour hand to show 3 o'clock. Erase the hour hand and have other children, in turn, show other times, to the hour.

Using the Page

- Read the words at the top of the page with the children. Discuss the first clock face with them. Ask what time is to be shown on the second clock face. Have the children draw the "short" (hour) hand first. Then have them draw the "long" (minute) hand. Let the children continue on their own. As the children work on each clock face, remind them to draw the hour hands short.

Add.

Subtract.

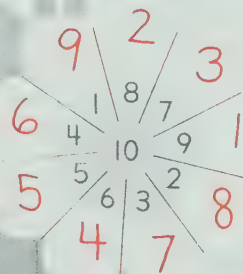
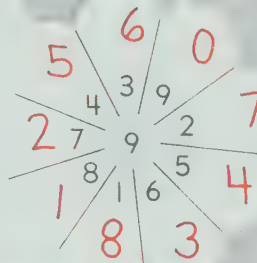
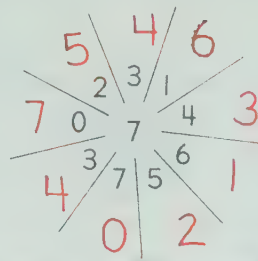
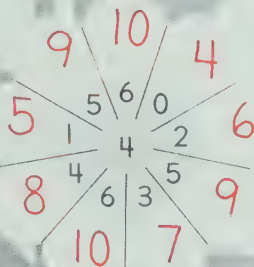
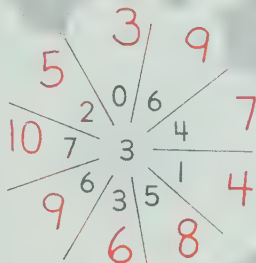
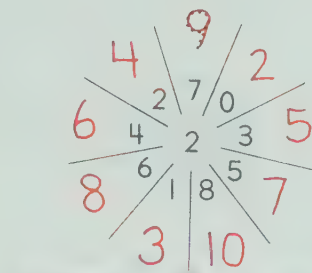
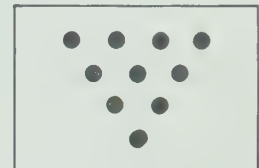
Page 169

OBJECTIVE

Complete basic addition and subtraction facts, sums and minuends to 10

RELATED ACTIVITIES

- You may wish to provide children with number wheels and / or hexagons cut from copies of page T338 for further practice with addition and subtraction.
- Have the children use addition to check their answers for the subtraction exercises on page 169.
- Arrange as shown ten suitable objects to represent bowling pins. Have the children, in turn, roll a ball to knock down the "pins". Have the other children write a subtraction sentence to describe each situation.



Addition and subtraction practice: sums and minuends to 10

(one hundred sixty-nine) 169

LESSON ACTIVITY

Before Using the Page

- Page 169 provides practice with addition and subtraction facts presented to date. You may wish to provide a quick review of several facts and note which children are able to respond without the aid of counters.
- Draw a number wheel on the chalkboard and review the procedure for showing the sums (differences).

Using the Page

- Direct the children's attention to the words at the top of the page. Emphasize that the three flowers in the first column involve addition exercises and the three flowers in the second column involve subtraction exercises. You may wish to have them complete all the addition exercises first.

OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

Materials

number line, real money, play money, or coin cutouts from copies of page T337, counters for each child

RELATED ACTIVITIES

- Have pairs of children play the following game. Each pair will need one game board similar to the one shown; 55 red cards, five for each of the numbers 0 to 10; 55 blue cards, five for each of the numbers 0 to 10.

The method for playing is given on page T219.

4 + 2	4 + 3	1 + 5	7 + 3
8 - 8	7 + 2	8 - 5	6 - 2
9 - 7	1 + 1	7 - 6	5 - 4
1 + 3	9 - 4	5 + 5	1 + 6
10 - 4	3 + 6	10 - 2	3 + 2
9 - 6	8 - 0	2 + 8	7 - 2

- Prepare a chart with pictures of fish on it. (See page T219.) Make a slit at the mouth of each fish so that one "worm" will fit into it. Print a numeral on each fish and an addition or subtraction phrase on each worm. Make at least four worms for each fish. Have the children take turns choosing a worm and placing it in the mouth of the appropriate fish.

LESSON ACTIVITY

Before Using the Page

- Draw the following diagram on the chalkboard and have children refer to it to complete the indicated related sentences. Use other similar examples.



$$1 + 3 = \underline{\quad}$$

$$\underline{\quad} - 3 = 1$$

- Draw a number line on the chalkboard. Have children label the points from 0 to 19 and say the name of each number. Ask questions such as the following:

"What number is one greater than 13?"

"What number is one less than 16?"

"What number is between 11 and 13?"

State expressions such as "one ten and six" and "ten plus four" and have children name the number. Then reverse the procedure by naming a number, for example, 17 and having children say, "One ten and seven" or "Ten plus seven".

Complete.

$$\begin{array}{r} 5 \\ + 2 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 8 \\ - 3 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 3 \\ + 4 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 7 \\ - 5 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 4 \\ + 6 \\ \hline 10 \end{array}$$



$$4 + 2 = \underline{6}$$

$$\underline{6} - 2 = 4$$



$$2 + 3 = \underline{5}$$

$$\underline{5} - 3 = 2$$



$$1 + 2 = \underline{3}$$

$$\underline{3} - 2 = 1$$



$$5 + 0 = \underline{5}$$

$$\underline{5} - 0 = 5$$

$$10 + 5 = \underline{15}$$

$$10 + 9 = \underline{19}$$

1 ten and 4 is 14

$$17 = 10 + \underline{7}$$

$$12 = 10 + \underline{2}$$

16 is 1 ten and 6

is 13 ¢

18¢ is



11 o'clock

170 (one hundred seventy)



6 o'clock



7 o'clock



3 o'clock

CHECKUP

- To review sets of dimes and pennies, display a set of one dime and four pennies. Have children determine the value of the coins (14 cents). Repeat with other sets of coins.

- Pretend that you have some coins that have a value of 16 cents. Ask children to suggest what coins you might have (1 dime and 6 pennies, or 1 dime, 1 nickel, and 1 penny, or 3 nickels and 1 penny). Repeat with other values to 19 cents. Have the children work with coins to help them in discovering the possible combinations of coins.

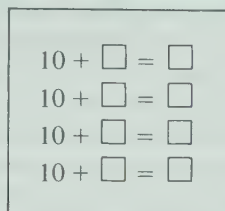
- Play a game in which a leader pretends to be a clock. The leader stands and holds her/his arms in a position to imitate the hands of a clock; that is, one hand is pointing straight up, and the other hand is pointing to the hour. The leader may find this easier to do if he/she stands at the front of the classroom, with his/her back to the class. The child who first guesses the hour indicated becomes the leader.

Using the Page

- Discuss with the children the different types of exercises to ensure that they know what to do for this *Checkup*. Then let the children work independently.

Teen Numbers (Game for page 152)

For four players, prepare four sets of markers showing the numerals from 1 to 9 (36 cards), four sets of markers showing the numerals from 11 to 19 (36 cards), and four game boards as shown.



Shuffle all the markers and place them face down in front of the players. Each player in turn picks up a marker and places it on her / his game board. If a player cannot place the marker on the board, it is returned face up to the display of markers (it may be picked up by another player), and the next player has a turn. The player who has a game board completed first is the winner.

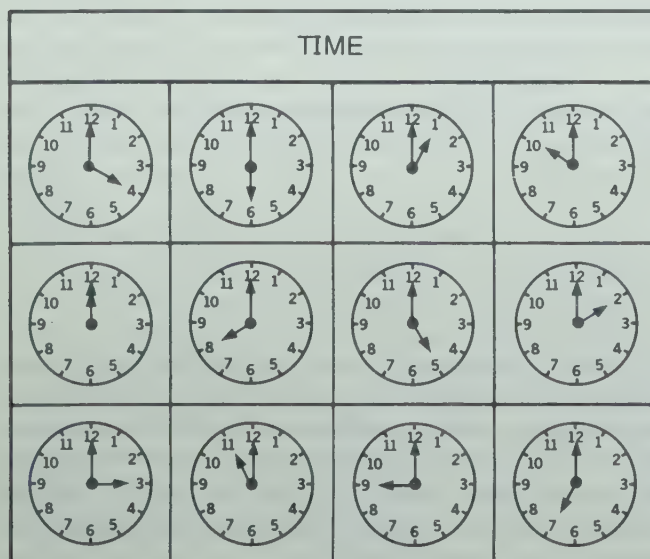
Time Bingo (Game for page 167)

For Five Players

Each of four players has a different card showing six clock faces with the hands at different hours. The fifth player acts as leader and has twelve cards with 1 o'clock to 12 o'clock written on them. The leader shuffles the cards, chooses one, and calls out the time. Each player having that time shown on a clock face uses a marker to cover the clock face. The player who first covers all the clock faces wins and becomes the leader.

For Ten or More Players

Each player has a card showing an array of twelve clock faces with the hours from 1 to 12 marked at random. Before the leader selects cards as described above, a rule for winning is chosen, for example, covering four clock faces in one row, or covering two columns of clock faces, or covering one row and one column of clock faces.



CLOCKS AND WATCHES

Our great
Steeple clock
Goes TICK-TOCK,
TICK-TOCK;

Our small
Mantel clock
Goes TICK-TACK, TICK-TACK,
TICK-TACK, TICK-TACK;

Our little
Pocket watch
Goes tick-a-tacker, tick-a-tacker,
Tick-a-tacker, tick.

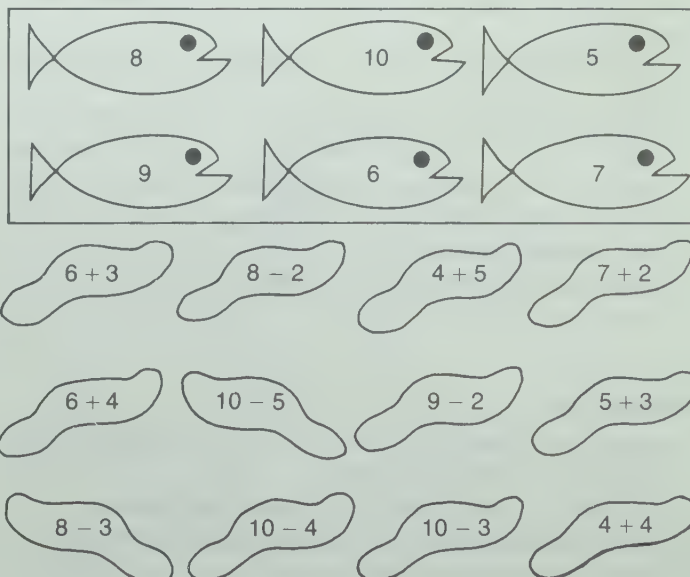
Song for page 168

Tick-tock, tick-tock,
Merrily sings the clock.
It's time for work,
It's time for play,
So it sings throughout the day.
Tick-tock, Tick-tock,
Merrily sings the clock.

Rules for the game on page T218

Each player uses one set of cards placed in a bag or a box. The players take turns drawing a card from their set and matching it with a number name on the game board. Only one card may cover each number name. If the card cannot be matched or if a card is matched incorrectly, it is put aside and the player must wait for the next round. The game continues until all the cards have been used or until the game board has been covered completely.

Chart for page 170



Unit 9 Overview

In this unit most of the emphasis is placed on two-place numerals to 50. After a number of exercises to reinforce the concepts, the numbers are ordered from 1 to 50. The fraction concept *one-half* is introduced with reference first to objects and then to sets. Children determine whether two parts of an object are equal or unequal and whether or not a set is separated into two halves. They find the number in one-half of a set and also determine the number of a whole set if one-half of the set is given. Related basic addition and subtraction facts that were introduced in the previous unit are extended to sums and minuends of 7 and 8. The children are led to discover that the order of adding three or more numbers does not affect their sum (associative property). The quarter is presented as a coin having a value of 25 cents. Children have experiences in calculating the values of given sets of quarters, dimes, nickels, and pennies to 50 cents and also have experiences in selecting the required coins for amounts to 50 cents. The concept of one-half an object is extended to an examination of symmetry found in simple shapes. Selected three-dimensional shapes are also identified in familiar objects in the environment. The *Checkup* includes exercises to assess the children's knowledge and skills concerning addition, subtraction, numeration, one-half of a shape and a set, and values of given sets of coins.

Unit Outcomes

Number

- write standard numerals for the numbers from 10 to 19 and for tens from 1 ten to 9 tens
- identify one-half of an object or a shape
- recognize an object or a shape that is divided into two equal parts
- share to show one-half of a set
- find the number for one-half of a set
- identify one-half of the objects in a set
- distinguish between sets that show one-half and those that do not
- determine the number of a whole set, given the number of half the set
- complete related basic addition and subtraction facts, sums of 7 and 8
- recognize that the grouping of addends does not affect the sum
- find the sum of three numbers written in vertical form, sums to 10
- identify a set of tens and a set of ones and write the corresponding standard numeral, numbers from 20 to 50
- order the numbers to 50
- complete basic addition and subtraction facts, sums and minuends to 10

Measurement

- recognize a quarter and know that it is equivalent to 25 pennies and its value is 25 cents
- use quarters, dimes, nickels, and pennies for counting
- determine the value of a set of coins, amounts to 50 cents
- show sets of coins for amounts to 50 cents

Geometry

- recognize symmetry in simple shapes
- complete a symmetrical shape
- identify three-dimensional shapes in the environment

Background

Number: Place value, explored briefly with numerals to 19 in the previous unit, receives much greater emphasis in this unit as the numbers from 20 to 50 are introduced. Concrete materials such as Unifix cubes, Base Ten Blocks, and simple objects bundled in tens are used as models of the numeration system. Working with such models and discussing the meaning of corresponding two-place numerals in terms of tens and ones will help children acquire an understanding of the numerals, especially pairs like 23 and 32, which may be easily confused. Teen numerals may be particularly troublesome to some children because in reading them we say the ones' digit first, but in writing them we print the tens' digit first (sixteen, 16). This difficulty does not occur in the numbers and numerals from twenty on because the word name and the numeral both indicate tens first (twenty-four, 24).

When an object is divided into two parts, it is possible to obtain a smaller part and a larger part. If, however, the two parts are of the same size, they are called *halves*. In their everyday activities, children frequently meet the term "half" used incorrectly. Expressions such as "the bigger (smaller) half" have no meaning because halves are of the same size. Thus, it is important that inaccurate notions be replaced by correct concepts. Understanding fraction concepts depends on a realization that the parts must be of the same size (identical).

In the preliminary activities, children use objects and shapes that can be divided easily into two equal parts. Paper folding is also used to demonstrate the two halves of different shapes.

Finding one-half of a set provides an informal approach to division. Children are given the opportunity to solve problems such as finding how many objects each of two persons will receive if there are from 2 to 18 objects being shared. No formal presentation of division is made at this time, but sharing between two and finding one-half of a set serve as interesting forerunners of the operation.

In Unit 5, the children learned that the order in which two numbers are added does not change their sum. In this unit, children are required to find the sum of three numbers. Addition (subtraction, multiplication, division) can be performed on only two numbers at a time. If the sum of more than two numbers is required, two numbers are added first and then that sum becomes an addend with the next number. Children learn that grouping numbers into pairs for adding does not affect the final result.

$(3 + 2) + 4$	$3 + (2 + 4)$
5 + 4	3 + 6
9	9

This grouping (associative) property makes it possible to group addends for convenience and also to check the accuracy of computation by grouping different pairs. Children sometimes encounter difficulty in adding three or more numbers because the sum of each pair of numbers becomes an "unseen" addend for the next addition. This skill, however, is an important one and should be developed carefully.

Measurement: The coins penny, nickel, dime, and their values are reviewed; this leads to the introduction of the quarter and its value. Counting by ones, fives, and tens, to 50 is done with the aid of coins placed along a number line. Children are shown the traditional method of counting an amount of money; that is, starting with the coins of greatest value and proceeding in order to those of lesser value.

Telling time, to the hour, is reviewed. As an extension of the work on numbers one greater than or one less than a given number, it is suggested that children show time one hour later or one hour earlier than a given time.

Geometry: The paper-folding activities used in the development of the fraction concept *one-half* lead directly into the topic of *line (reflection) symmetry*, which is presented in this unit. The terms *symmetry* and *symmetrical* may be too difficult for children at this time, so shapes may be described as being the same on one side as they are on the other (left and right, top and bottom). Both sides are seen to have the same size and shape. By folding symmetrical shapes in half, the *line (axis) of symmetry* is located. For objects that cannot be folded, it is helpful to imagine a line through the middle. Children see the concept of symmetry as a natural one and invariably incorporate symmetry into their own drawings and paintings.

Teaching Strategies

Grouping for instruction in this unit is less dependent on previous progress than in some of the units. The concepts involved do not require mastery of basic addition and subtraction facts as a foundation. Only in connection with practice exercises and the lessons in which facts with sums of 7 and 8 are organized into related sets will previous achievement in basic facts be significant. The work with place value, money, fractions, and symmetry should be a refreshing change of pace.

In this unit the emphasis is on place value and the fraction *one-half*. Although limited attention is given to practice with basic addition and subtraction facts, it is important that children retain their skill in using number facts they have learned, and also gain mastery of the facts. Various materials and aids should be available for use in practice periods as well as in spare time. Games and activities used in earlier stages can be reintroduced for practice work. Children may work in pairs or in small groups, using flash cards of basic facts. Flash cards that present an incomplete sentence on one side and the complete number sentence on the reverse side are particularly valuable. For example, if one child holds up $8 - 3$ for another child to name, and at the same time sees on the back the number sentence $8 - 3 = 5$, both children benefit from the experience.

For place-value topics, pocket charts are recommended. (See page xxxi.) A demonstration chart should be large enough to hold bundles of ten objects in the tens' place. Smaller charts such as the flip chart described on page T242 are useful for individual use by children. These are good for responses to oral instructions, such as, "Show 5 tens and 7 ones." At a glance it can be seen which children place their cards correctly. The same charts can also be used for children to interpret two-place numerals. For example, if the children are to show the numeral 49, the positions of the two numeral cards can be checked quickly.

For counting amounts of money involving pennies, nickels, dimes, and a quarter, the prerequisite skills are counting by ones, fives, and tens. Children should be able to count by ones starting from any number, and by fives and tens starting from zero or any multiple of five. Such skills are required, for example, in the case of one quarter, one dime, and three pennies for which children would count 25, 35, 36, 37, 38; and in the case of two dimes, three nickels, and four pennies for which they would count 10, 20, 25, 30, 35, 36, 37, 38, 39. As indicated in the suggestions on page T244, a number line marked in fives can be used effectively to provide practice in counting in these particular ways.

Art activities may be used to provide applications of symmetry. Children can make symmetrical shapes by folding paper and cutting around the fold (through the two layers at the same time). These patterns can then be pasted, or traced, and colored to make varied borders or overall designs. Such activities help children to see that the shape on one side of a line of symmetry is the same as the shape on the other side of the line of symmetry.

Materials

objects suitable for grouping by tens
three sets of numeral cards for 0 to 10
two cards for each of the symbols +, -, and =
apple, sandwich, cookies, objects to be cut in half
paper geometric shapes for cutting in half
display board, cutouts, string or yarn
objects for sharing, devices for set holders
twelve counters and crayons for each child
Unifix cubes
pictures of symmetrical objects and shapes
pocket chart (See page xxxi.)
Base Ten Blocks (optional)
numeral cards for 1 to 50
chart for the numbers from 1 to 50 (See page T343.)
number line for demonstration
demonstration clock
real money, play money, coin cutouts from copies of page T337
cards showing prices to 50¢
three-dimensional models in wood or plastic, a soup can, a log of wood

Vocabulary

equal parts	tens' place
one-half	ones' place
half	later
halves	earlier
share	quarter
fold	fives

Unit 9 Theme – In the City

The purpose of this unit is to acquaint children with some aspects of life in an urban environment. Children who live in an urban setting will enjoy pointing out advantages of living in the city. They should be encouraged to compare their lifestyles with those suggested in this unit.

Set up a city display that will grow as the children contribute class and individual work. Provide a background of colored pictures showing stores, churches, restaurants, schools, and parks. Also include pictures depicting services such as those provided by the police, the fire department, and hospitals. You may wish to include, if possible, some costume props, for example, a mail carrier's canvas shoulder bag or a construction worker's hard hat. Include books that show community helpers involved in transportation and communication.

LANGUAGE ACTIVITIES

1. Life in an Urban Community

For the following activity, the children should visit, interview, and discuss to gain knowledge of services available in the community and also of the people who help us. Parents of the children who perform various duties may be willing to visit the school and to tell about their occupations.

Take the children on a walk through the community in which the school is located. If the school is located in a rural area, use films, pictures, books, or try to arrange a tour of an urban community.

After the walk or tour, record the observations of the children. Discuss the information gathered by the children and classify it under the headings "Recreation", "Transportation", "Stores and Services", and "Helpers". These classifications can become the sections for a book entitled "Our City Community". Select a different category each day. Record all the facts and details that the children can contribute. Include their pictures and stories in the book.

The following are some suggestions of things to watch for and discuss in each of the four categories.

Recreation

park	golf course
ice arena or rink	football field
swimming pool	tennis court
movie theatre	bowling centre
fitness centre	baseball diamond

Transportation

bus	truck
car	moped
street car	motorcycle
commuter train	bicycle
subway	on foot

Stores and Services

food	laundry
drug	clothing
pet	variety
bank	department
shoe	barber
travel	dry cleaning
music	trust company
florist	photographer

Helpers

doctor	crossing guard
dentist	street cleaner
optometrist	hydro lineman
policeman	fireman
postman	telephone repairman

2. Witness Account

Children should learn to be observant of the actions of others in case they need to give information about such things as an accident, a fire, a robbery, a lost child.

Choose one child to play the part of a suspected person while the other children act as witnesses. The suspected person plans and acts out a sequence of four or five different actions. For example, he/she may open a cupboard door and look for something, go to the window and peer out, tiptoe to the door, open the door and listen, then hurry back to his/her seat and say, "I'm innocent." The witness who can report all the actions of the suspected person in the proper sequence may become the next suspected person.

3. City Child or Country Child

Discuss with the children ways in which they would try to make their city or town a better place to live in. Ask what things they would change and what things they think need no improvement. Have them state whether they prefer to live in the city or in the country and give reasons for their preference. On a chart, list these reasons under the headings "City Life for Me" and "Country Life for Me".

4. News Bulletin

There is at least one major newspaper published in every city. Obtain large newspapers from several different cities and have the children note the different parts of a newspaper – headlines, editorial pages, sports section, entertainment guide, financial matters, comic strips. Ask the children which part of the newspaper you would consult if you wanted to go to a movie, to know who won last night's hockey game, to find out what people thought of a recent increase in the cost of living.

Have the children plan a class newspaper. Include in it all the sections found in a large newspaper. This newspaper can be distributed to other classes in the school and to parents.

MATHEMATICS ACTIVITIES

1. Classifying

Using the headings from Language Activity 1, record one title on each of four charts. Have the children cut and paste pictures from magazines to depict recreation, transportation, stores and services, and helpers.

When the charts are completed, have the children ring the pictures of things found in the community being considered.

2. Matching

Cut twelve cards measuring 16 cm by 16 cm. Paste a picture of some item found in the community in the centre of each card. Cut each card in half.

Have the children place the cards face down at random. Let the children take turns exposing two cards. A player who

exposes both halves of a picture may keep the completed picture. The player who collects the most pictures is the winner.

3. Three-Dimensional Shapes in the Environment

Draw each of the three-dimensional shapes on page 192 on an individual chart. Have the children name objects and buildings in the community that have these basic shapes. Record the suggestions on the appropriate charts. Have the children discuss relationships between the shapes; for example, have them observe which shape is used most (least) often.

4. Using Coins

List five items that the children like to buy at the local variety or corner store. Record the cost of each item. Draw the fewest coins that can be used to pay for each item.

Have the children record other combinations of coins that could be used to pay for each item. You may wish to have the children draw other items, record the price of each, and show the coins that can be used to pay for each item.

5. Street Survey

The following activity will be a valuable experience for the children because it will involve classifying, counting, comparing, recording information, and graphing.

Choose one street near your school for an in-depth study. Some aspects that your class could explore are as follows:

- the types of houses on the street (single dwellings, duplexes, apartment buildings, town houses)
- the materials of which the exteriors of the houses are constructed (wood, brick, stone, concrete)
- the number of one-storey houses and two-storey houses
- the number of houses on each side of the street
- the number of cars that are parked on the street
- the number of cars that are parked in driveways
- the number of houses that have a garage
- the sequence of the house numbers on each side of the street

6. Green Light

This activity will help to reinforce place value for two-digit numbers. You will need two sets of numeral cards for 0 to 9. Paste each numeral card on a large green circular shape so that it will look like a green traffic light.

Form two teams with ten players on each team. Give one set of "green lights" to each team and let each member choose one. When all the green lights have been claimed, call out any number from 10 to 99. The two players from each team must run to a designated "intersection" in the classroom and take positions so that the green lights will represent the correct number. The team that first displays the correct number scores one point. The team that first scores ten points is the winner.

7. Post Office

This activity will provide practice in basic addition facts in a novelty situation.

You will need ten large envelopes or ten flat boxes, each identified by a numeral from 1 to 10. You will also need 20 to 30 addition fact cards for sums to 10.

Divide the class into groups with four or five players in each. Each member of the first team is given an addition fact card. Each player must deliver the card to the "mail box" for that particular sum. As the postal official, you must check to see that each piece of "mail" has been delivered correctly.

Then the other teams in turn deliver mail. The team that first completes three correct deliveries is the winner.

SCIENCE ACTIVITIES

1. Pollution

Introduce the word *pollution*. (Many children will have a good idea of what the word means.) Lead the children in a discussion about water pollution, air pollution, and noise pollution. On a chart, list different polluting situations. Ask the children to suggest ways in which the pollution in these situations could be reduced.

2. Checking for Air Pollution

For this experiment you will need four strips of flypaper. Hang one of the strips in your classroom. Obtain permission to hang one strip in a building near a busy street, one strip in the workroom of an automobile service station, and one strip in an air-conditioned room. Leave the strips in place for one week. At the end of the week, collect the strips and have the children observe what has happened to the strips. Ask the children what conclusions they can make about air pollution.

SOCIAL STUDIES ACTIVITIES

1. Communication in an Urban Community

As you discuss communication in an urban community, compare the following aspects with those discussed for a rural community.

Mail

- Mail is delivered by a carrier who travels on foot and carries the mail in a canvas shoulder bag.
- Mail is delivered to the door of each house or to the mailboxes in the entrance to an apartment building.
- A letter to be mailed is dropped into a specially marked box located on a street nearby.
- Information on the mailbox tells when the mail is collected each day.

The Newspaper

- A large city has its own newspaper. Some cities have two or three newspapers.
- A city newspaper contains news from all over the world as well as news from the city.
- The newspaper may be delivered to one's home or picked up from a newspaper box on the street or from a variety store.

The Telephone

- Almost all city telephone systems are dial or push-button systems.
- The operator is required only for providing information or assisting in making special calls.
- Some people have two or three telephones.
- Most people have their own private line, but some people share a line with one other party.

Visiting

- Many people can walk to visit friends or neighbors who live close by.
- If friends or relatives live farther away, it is necessary to go by car or by public transportation.
- Many people meet at recreation centres such as a swimming pool or a hockey rink.

The School

- a. Many children in the city can walk to school.
- b. Many children live close enough to the school so that they can go home for lunch.
- c. Many schools have special programs at the end of each school day, because children do not have far to go home.
- d. Many parents use the school at night for special programs.

2. North, South, East, West

Introduce the concept of *direction* and the words *north*, *south*, *east*, and *west* to the children. Tell the children that during the day they can find their way around their neighborhood by observing the position of the sun: the sun always rises in the east and sets in the west. Take the class to the playground in the morning and again in the late afternoon to observe the position of the sun. Explain that when they stand facing the sun early in the morning they are looking towards the east; west is behind them; south is on their right; and north is on their left.

In the centre of a large sheet of paper draw a picture of the school. Have the children draw and paste in the correct location some of the familiar places in relation to the location of the school.

3. Street Map

Draw an outline of the school in the centre of a large sheet of paper. Record the names of the streets on which the children live. After a walk through the community, draw each street on the map. Place a marker on the map where each child lives and record the child's name on it.

Have the children use a pointer to show the route that they follow in going from home to school, to their best friend's house, and so on.

4. Community Map

Choose a small area near the school or some nearby intersection that will form the basis for an interesting three-dimensional map. Take the class for a walk around the area and have the children note the buildings, trees, traffic lights, street signs, and so on. Make rough sketches to help in remembering the relationships of these to one another.

Mark off a section of the classroom and help the children to lay out the area to be mapped. Boxes, blocks, cardboard or plastic containers can be used to make buildings and houses. Construction paper and cardboard tubes can be used for trees, traffic lights, and street signs.

As the work on this project progresses, the children may need to make a return visit to note things that they may have missed or recorded incorrectly. When the three-dimensional map is completed, you may wish to have the children use toy cars and other models to demonstrate traffic laws and safety precautions.

5. Local Production

Arrange with the manager for the children to visit a local supermarket. Have the children find items that were produced locally. Discuss with the manager how these items came to the supermarket. Determine whether the items produced locally are less expensive than corresponding items produced in other parts of Canada or in other countries. After the visit to the supermarket, you may wish to take the children to visit the factory where one of the items is made.

6. Newsmakers

This activity can be used to help children become more aware of events in their city and recognize the persons involved.

On cardboard of an appropriate size, paste a picture from a newspaper of a person or a building that has been in the news. The persons could be in politics, sports, or the arts; the buildings could be museums, churches, factories, or schools. On the back of each card write a numeral from 1 to 5, depending on the difficulty you think the children may have in identifying the picture.

Divide the class into two teams. Select one of the newsmaker cards. Show the picture side only to the first team, giving the members about fifteen seconds to confer and guess. If they answer correctly, they are awarded the number of points on the back of the card. If they answer incorrectly, the picture is shown to the second team. The team with the greatest number of points after all the cards have been used is the winner.

The newsmaker cards can be reviewed and updated periodically to help keep the children interested in local affairs.

ART ACTIVITIES

1. My Favorite Spot

Have each child paint a picture of her/his favorite spot in the community. Include these paintings in the city display.

2. Wall Textures

Take the children on a tour of the neighborhood to study different textures of the walls of buildings. If you plan the route in advance, you may be able to include such textures as glass, wood, brick, marble, fieldstone, steel, concrete. Provide the children with dark crayons and thin sheets of white paper to make wall rubbings of different textures. Discuss with the children the characteristics of the different textures and which textures are distinctive enough to show what the wall is made of.

3. Building Collage

From magazines and newspapers, have the children collect pictures of the different kinds of buildings in the city where people live, work, and play. The pictures can be pasted on three large sheets of paper having the headings "People Live Here", "People Work Here", and "People Play Here".

MOVEMENT ACTIVITIES

1. Transportation Whirl

Ask the children to choose methods of transportation in the city. Have the children, individually or in small groups, use appropriate movements and sounds to demonstrate the method chosen. Have the remaining children try to guess each method demonstrated.

MUSIC ACTIVITIES

1. City Sounds

In the city there is an abundance of varied and unusual sounds. Let the children try collecting some interesting sounds on a tape recorder. You may wish to collect sounds heard in stores, sounds of traffic, and sounds of people going about their duties. These sounds can be illustrated and identified in a book entitled "City Sounds".

Unit 9

LESSON OUTCOME

Write standard numerals for the numbers from 10 to 19

Materials

objects for grouping by tens

RELATED ACTIVITIES

• Make a set of ten cards on which the number names 1 ten, 1 ten and 1, 1 ten and 2, and so on to 1 ten and 9 are printed. Make a second set of ten cards showing the numerals from 10 to 19. Have children match each number name with the standard numeral.

You may also wish to make a set of ten cards on which the number names 1 ten, 2 tens, 3 tens, and so on to 9 tens are printed. A second set would show the numerals from 10 to 90. As before, have children match each number name with the corresponding standard numeral.

Instead of making the sets of cards, you may prefer to make a work sheet and have the children draw lines to match each number name with the corresponding standard numeral.

A	10	J	20	R	13
B	12	K	17	S	30
C	16	L	12	T	18
D	80	M	70	U	14
E	15	N	13	V	60
F	18	O	17	W	14
G	50	P	15	X	90
H	11	Q	16	Y	19
I	11			Z	40

A	1 ten	J	2 tens	R	1 ten and 3
B	10 + 2	K	10 + 7	S	3 tens
C	1 ten and 6	L	1 ten and 2	T	1 ten and 8
D	8 tens	M	7 tens	U	10 + 4
E	10 + 5	N	10 + 3	V	6 tens
F	10 + 8	O	1 ten and 7	W	1 ten and 4
G	5 tens	P	1 ten and 5	X	9 tens
H	1 ten and 1	Q	10 + 6	Y	1 ten and 9
I	10 + 1			Z	4 tens

Write the numeral in the correct window.

Writing two-place numerals

(one hundred seventy-one) 171

LESSON ACTIVITY

Before Using the Page

- Review the idea of tens by displaying groups of ten objects. Have a child hold up one group and say, "One ten is ten ones." Write the numeral 10 on the chalkboard. Have a second child hold up two groups and say, "Two tens are twenty." Have another child write 20 on the chalkboard. Continue until 90 has been included. Have the children say the numbers in unison from ten to ninety.
- Tell the children you want 50 objects. Ask them how many groups of ten you would need. Have a child choose the number of groups and count by tens to show that the response is correct. Repeat for 40, 70, 20, 60, and so on.
- Display groups of ten objects and single objects. Hold up one group of ten and two single objects. Ask a child how many you have. If the child says, "One ten and two", ask, "How many is that?" The child should then say, "One ten and two are twelve." Have another child write 12 on the chalkboard. Repeat for the other numbers at random to 19.

- Write $10 + 1$, $10 + 3$, $10 + 5$, and other similar phrases on the chalkboard. Ask children to show the standard numerals by writing complete number sentences.

Using the Page

- Discuss with the children that for each number name identified by the letters A to Z they are to find the window with the corresponding letter and print the standard numeral for the number named. Ask what number is named by 1 ten. Have the children trace over the dotted 10 in window A.
- After the children have completed the page, you may wish to ask questions similar to the following:
 - "Which number is greater, the one in window A or the one in window B?"
 - "Is the number in window S greater than or less than the number in window T?"
 - "Why is the number in window X greater than the number in window Y?"
 - "Why is the number in window P less than the number in window Q?"

OBJECTIVE

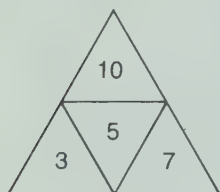
Complete basic addition and subtraction facts, sums and minuends to 10

Materials

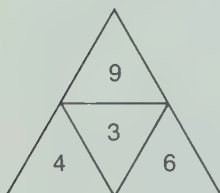
three sets of numeral cards for 0 to 10,
two cards for each of the symbols +,
-, and =

RELATED ACTIVITIES

- Prepare several triangular shapes showing four numbers, similar to the examples below. Give one to each child and ask her / him to write an addition sentence or a subtraction sentence for three of the given numbers. Show the possible sentences on the back of the shape if you wish to have the children check their own work.



$$\begin{aligned} 3 + 7 &= 10 \\ 7 + 3 &= 10 \\ 10 - 7 &= 3 \\ 10 - 3 &= 7 \end{aligned}$$



$$\begin{aligned} 3 + 6 &= 9 \\ 6 + 3 &= 9 \\ 9 - 6 &= 3 \\ 9 - 3 &= 6 \end{aligned}$$

Show + and =.

~~2 + 3 = 5~~ ~~4 + 2 = 6~~

~~1 + 4 = 5~~ ~~4 + 4 = 8~~

~~7 + 3 = 10~~ ~~3 + 4 = 7~~ ~~2 + 2 = 4~~

~~5 + 4 = 9~~ ~~5 + 1 = 6~~ ~~6 + 3 = 9~~

~~3 + 0 = 3~~ ~~4 + 6 = 10~~ ~~2 + 2 = 4~~

Show - and =.

~~5 - 2 = 3~~ ~~6 - 4 = 2~~ ~~8 - 7 = 1~~ ~~10 - 5 = 5~~

~~8 - 3 = 5~~ ~~7 - 0 = 7~~

~~6 - 3 = 3~~ ~~9 - 5 = 4~~

~~5 - 5 = 0~~ ~~3 - 1 = 2~~

~~7 - 2 = 5~~ ~~9 - 6 = 3~~ ~~3 - 1 = 2~~

172 (one hundred seventy-two)

Addition and subtraction practice: sums and minuends to 10

LESSON ACTIVITY

Before Using the Page

- Display the numeral cards and the cards for + and = on the chalkboard ledge. Select cards needed to form $4 + 2 =$ and display the incomplete sentence. Ask a child to show the appropriate card to complete the sentence ($4 + 2 = 6$). Use other similar examples.
- Display three numeral cards to show $8 + 1 = 9$. Ask a child to show the cards for + and = in the appropriate places to relate the three numbers by addition.
- Display four numeral cards to show, for example, $1 + 2 + 4 = 7$. Tell the children that one of the cards is not needed. Ask a child to place the cards for + and = to show which three numbers are related by addition. Repeat the procedure for other similar examples and for examples such as $3 + 2 + 5 = 10$. Emphasize that the children are not to change the order of the cards. Then extend the activity so that the children are presented with seven numeral cards and the task of finding two addition sentences. You may wish to have the children indicate that a number is not needed by turning the corresponding card over.

$$\boxed{2} + \boxed{1} = \boxed{3} \quad \boxed{8} \quad \boxed{9} + \boxed{0} = \boxed{9}$$

- Adapt the preceding activities for finding three numbers related by subtraction.

$$\boxed{6} - \boxed{4} = \boxed{2} \quad \boxed{4} - \boxed{2} = \boxed{2}$$

Using the Page

- Emphasize that the first set of exercises involves only addition and the second set, only subtraction. Emphasize that in each row, only one of the numbers is not needed. It may be helpful to have the children cross out the number in each row that is not needed. The children may also find it helpful to draw a ring around each number sentence that they complete. Note that there are three possible subtraction sentences in the last row. Let the children use counters for assistance, if needed, or to check their work.
- After the children have completed the page, direct their attention to the second column of numbers in the first set of exercises. Point out the 1, the 3, and the 4 and ask a child to state the addition sentence that tells how the three numbers are related.

LESSON OUTCOME

Identify one-half of an object or a shape

Materials

objects to be cut in half, geometric shapes to be cut in half, crayons for each child

Vocabulary

equal parts, one-half, half, halves

RELATED ACTIVITIES

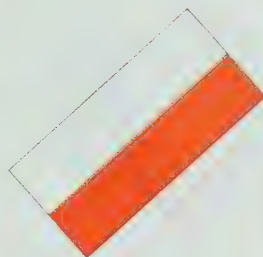
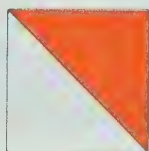
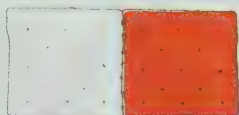
- Have the children draw pictures of things that are often divided or cut in half: pies, candy bars, sandwiches, fruit. Ask the children to indicate how each should be divided or cut to obtain two parts that are of the same size.
- Give each child a rectangular piece of paper. Show the children one way to fold it to show halves. Have them discover another way to fold the paper in half.



- Give each child a square piece of paper. Have the children fold the paper to show halves. Encourage the children to find four ways to fold the paper to show halves. Display these four ways so that the children can study them.

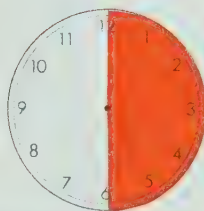
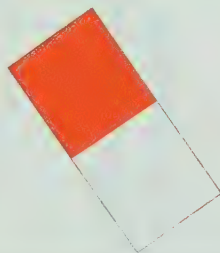
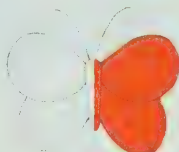
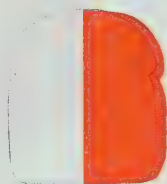


Color one half of each shape.



Mark and color one half of each shape.

Answers may vary.



Showing one-half

(one hundred seventy-three) 173

LESSON ACTIVITY

Before Using the Page

- Display an apple. Tell the children that you want to share the apple with a friend. Let them discuss how you should cut the apple. Have one child direct you while you cut the apple. When the apple has been cut, ask children if the parts are of the same size. Explain that the apple has been cut into *identical parts* or *equal parts*. Ask how many equal parts there are. Emphasize that each part is one of two equal parts. Because some of the children may be familiar with the concept of one-half from everyday experiences, ask if anyone knows what one part is called. If not, introduce the term *one-half*. Try to avoid the use of the word *fraction* at this time. Note that the symbol $\frac{1}{2}$ does not appear in this book.

Repeat the procedure using other objects that can be cut into two equal parts. By asking questions about the number of equal parts, lead children to state that there are two halves in a whole object and that each part is half of the object.

- In turn, cut a square, a circular, a rectangular, and a triangu-

lar shape into two equal parts. Have children place the two parts of each shape together to check that each part is one-half of the shape.

Using the Page

- Read the first instruction with the children. Ask how many parts are shown for the cracker. Ask what each part is called. Have the children color over the gray half of the cracker. Then have the children color one half of each of the other diagrams.
- Read the second instruction with the children. Discuss where the line should be drawn on the slice of bread. Some children may suggest a diagonal line because they will think of the way their sandwiches are cut at home. Such a cut does not give two identical parts for slices of bread having the shape shown. Have the children draw the vertical line and then color one of the halves. Let the children continue on their own. Note that there is more than one answer possible for the rectangle and for the square. Many answers are possible for the clock face. You may wish to lead the children to draw the line through the 12 and the 6 as a forerunner of the half-hour.

LESSON OUTCOME

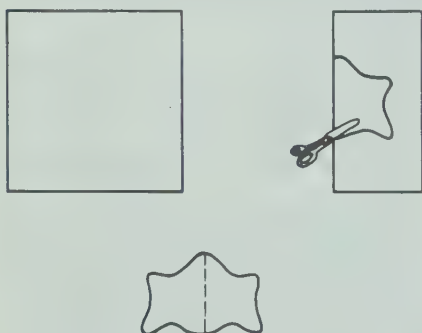
Recognize an object or a shape that is divided into two equal parts

Materials

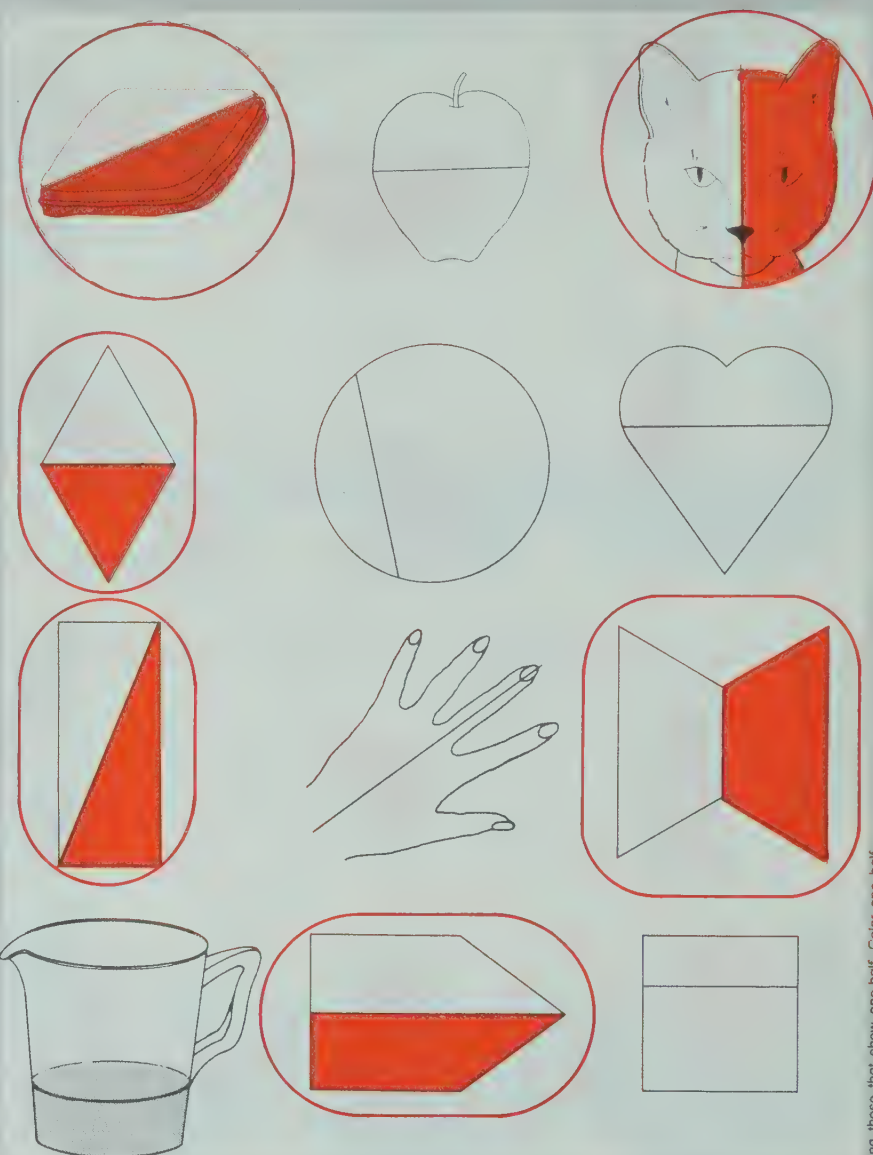
shapes and objects to be cut into two parts, display board and cutouts, string or yarn, crayons for each child

RELATED ACTIVITIES

- Have the children try to draw lines to indicate two equal parts for the apple, the circle, the heart, and the square shown on page 174.
- Give each child a square piece of paper. Have the children fold them in half and draw a shape about the fold. Have the children cut out the shapes and unfold them to show whole shapes divided into halves. The shapes may be colored and displayed in the classroom.



Ring, and color one half.



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Recognizing one-half

LESSON ACTIVITY

Before Using the Page

- Display a triangular shape that has been cut into two equal parts. Ask if the parts are of the same size and how many equal parts there are. Ask what each part is called (one half) and how many halves make a whole triangle (two). Repeat with other shapes.
- Tell the children that you are going to share a cookie with someone. While the children watch, cut the cookie into two parts, one of which is distinctly larger than the other. Ask a child to indicate which piece he/she would like to have and why. Let the other children react to the fact that the two pieces are not of the same size. Remind the children that halves of an object must be of the same size.
- Display shapes that show halves and other shapes marked to show two parts that are not of the same size. Have the children discuss whether a shape shows halves and, if not, why not.
- Place a circular shape on the display board. Place a piece of string or yarn across the shape so that it does not indicate two

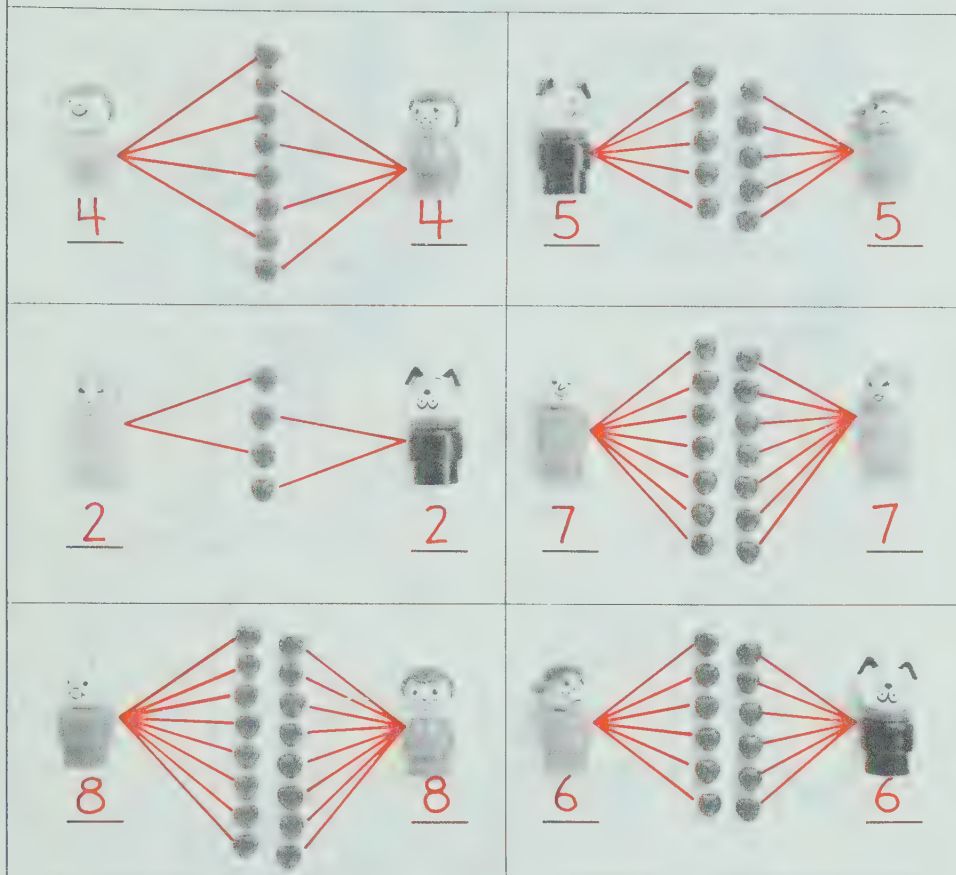
equal parts. Have the children discuss whether or not halves are shown. Move the string until the children are satisfied that it indicates halves of the circular shape. Repeat this procedure using other shapes.

Using the Page

- Read the instruction with the children. Ask how many parts are shown for the sandwich. Ask whether the two parts are equal. Have the children trace over the ring and color over the gray half. Remind the children to ring only those pictures that show two equal parts and to color one of those parts.

After the children have completed the page, discuss each illustration with them. Have them give their reasons for not marking the heart, the hand, and the pitcher, for example. If some children did not mark the rectangle, take a rectangular piece of paper, fold it along a diagonal, cut the pieces apart, and have someone check whether the two parts are of the same size.

Share.



Sharing between two

(one hundred seventy-five) 175

LESSON OUTCOME

Share to show one-half of a set

Materials

objects for sharing, set holders, display board and cutouts, pieces of string or yarn

Vocabulary

share

RELATED ACTIVITIES

- Prepare a work sheet for each child as shown below. Have the children draw pictures to show half of each set, or arrange counters in the spaces, and then write the numerals to show how many there are in half of each set.

Show half of		
6		3
10		
4		
8		
14		
12		

LESSON ACTIVITY

Before Using the Page

- Sharing is the earliest experience with the concept of division. Sharing is introduced here as preparation for the concept of one-half of a set.

Have the children work in pairs. Give each pair of children an even number of objects (not more than 18) and have them share them equally. Each child, in turn, takes one object until they both have the same number of objects. Ask each child how many objects he / she has.

If you prefer to have the children work alone, give each child two set holders and an even number of objects (not more than 18). Call out a particular number and ask the children to share that number of objects between the two set holders. Ask them to count the objects in each set holder. Have the children make statements about what they did; for example, "I had eight beans. I put four beans in each can. Two sets of four make eight, so four is one-half of eight." This procedure ini-

tiates the idea of one-half of a set and hints at multiplication and division.

- Place six cutouts on the display board and cutouts of two children. Give pieces of string or yarn to each of two children and have them take turns matching a cutout to a child. When they have completed the matching, have them state how many each child has. Repeat for ten cutouts.

Using the Page

- Direct the children's attention to the word "Share" at the top of the page. Ask how many red hearts there are to share. Discuss how the lines for matching show the sharing of the six hearts. Ask how many hearts each person gets. Have the children trace over the two dotted 3's and then print 3 to answer the question. Have the children draw lines for matching for each of the six exercises and then record the number for each part of the set.

LESSON OUTCOME

Find the number for one-half of a set

Materials

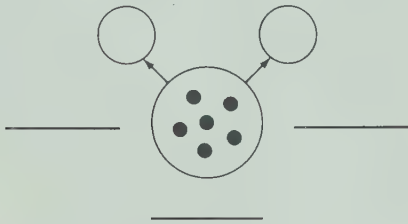
objects for sharing, twelve counters for each child

RELATED ACTIVITIES

- Adapt the work sheet suggested in *Related Activities* on page T229. Show six sets with one to five drawings of objects or shapes in each. Have the children consider each of these as half a set and draw the other half of the set. Then have them write how many there are in each half and how many there are altogether.

When the children have completed the work sheet, you may wish to discuss with them statements of the following types: half of 8 is 4; two fours are 8; 4 and 4 are 8; $4 + 4 = 8$.

- Prepare a work sheet showing sets of objects to be shared equally by two.



Have the children cross out the objects in the set to be shared and show them in two equal groups. Then have the children record the number for the whole set and the number for each group.

LESSON ACTIVITY

Before Using the Page

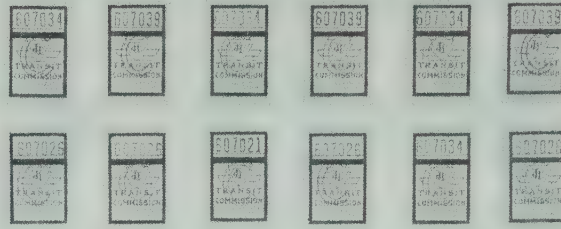
- Give each of several children a different number of objects (2, 4, 6, 8, 10, or 12) to be shared. Ask each child to share her/his objects with one other child. Move among the children and ask questions similar to the following:
 - “How many objects did you have at first?”
 - “How many equal groups were made by sharing?”
 - “What part of the whole set does each child have?”
 - “How many objects does each child have?”
 - “How many objects are there in one-half of a set of 2 (4, 6, 8, 10, 12)?”

- Draw six apples on the chalkboard. Have two children draw lines to show how many apples each child will get if they share them. Repeat for other even numbers of apples.

Using the Page

- Read the word “Share” with the children. Ask how many tickets are shown at the top of the page. Ask how many tickets

Share.



6 's for 2 boys
3 's for each boy

4 's for 2 girls
2 's for each girl

2 's for 2 girls
1 for each girl

8 's for 2 boys
4 's for each boy

6 's for 2 boys
3 's for each boy

10 's for 2 girls
5 's for each girl

8 's for 2 girls
4 's for each girl

12 's for 2 boys
6 's for each boy

176 (one hundred seventy-six)

Sharing between two

each child would get if two children shared them. Have a child read the words of the first problem. Ask how many tickets each boy will get. Have the children write the answer.

Provide each child with twelve counters and let them work independently. Some children may be able to work at a more abstract level and use the pictures of the tickets at the top of the page.

LESSON OUTCOME

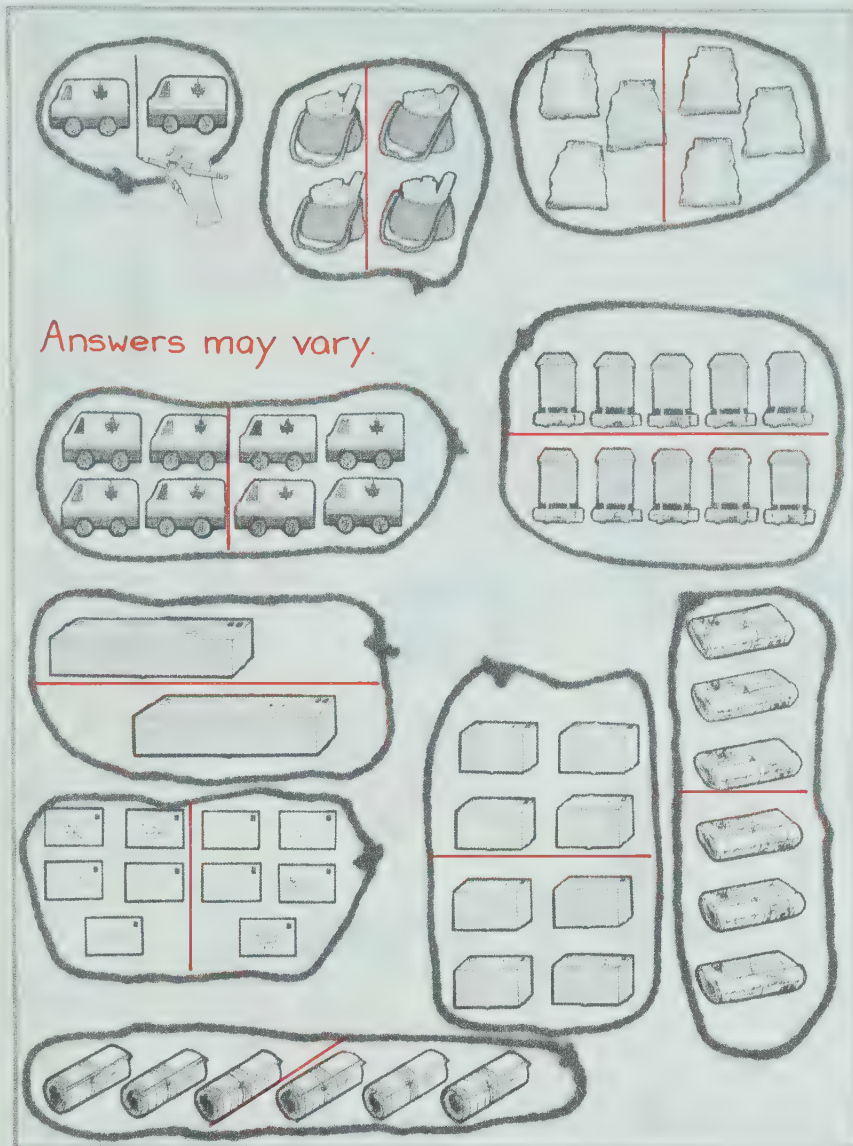
Identify one-half of the objects in a set

Materials

Unifix cubes, sets of small objects, loops of string, ten counters for each child, crayons for each child (optional)

RELATED ACTIVITIES

- If you did not use the suggestions in *Related Activities* on pages T229 and T230, you may wish to do so now.
- Have children use balance scales to find, or illustrate, halves of sets of uniform units such as washers, paper clips, and new crayons. When the beam is horizontal the two sides have the same number of objects.



Answers may vary.

Identifying one-half of a set

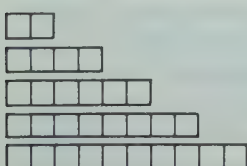
(one hundred seventy-seven) 177

LESSON ACTIVITY

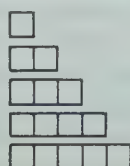
Before Using the Page

- Ask an even number of children (not more than 10) to stand in front of the chalkboard. Ask another child to separate the group so that half of the group will be standing and the other half will be sitting in front of the chalkboard. Ask if each group has the same number of children. Have other groups of children engage in activities so that one half does one thing and one half does something else.
- Display two Unifix cubes joined together. Have a child separate the cubes into two piles, each labelled *one half*. Repeat the procedure for four, six, eight, and ten cubes.

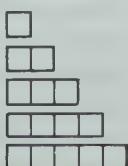
All




One half



One half



- Display sets of objects (not more than 12) arranged in patterns. The children should be able to indicate one-half of an arrangement such as  just by looking at it. Have the children place a loop of string around one half of each set.

Using the Page

- Read the instruction for the page with the children. Ask a child what the hand is showing for the first set. The objects in many of the sets are arranged in such a way that the children can see one-half of each set at a glance. If they cannot see one-half of the set at a glance, have them count the objects in the set, take that number of counters, and separate them into two equal groups. You may prefer to have the children do the separating on the page by using two crayons of different colors. For each parcel colored red, they could color one parcel blue. Then the red parcels and the blue parcels can be counted to check that each color makes up one half of the set. Note that one-half of some of the sets can be indicated in more than one way.

LESSON OUTCOME

Distinguish between sets that show one-half and those that do not; determine the number of a whole set, given the number of half the set

Materials

sets of objects, loops of string, display board and cutouts

RELATED ACTIVITIES

- Make cards showing sets of objects that can or can not be separated into halves. One child can display the cards for the other children who will say "yes" to indicate that the set shows halves or "no" to indicate that the set does not show halves. The answer can be on the back of each card for checking. For the sets that are separated into halves, have the children make the appropriate statement, for example, "Three is half of six."

Ring the sets that show one-half.

3 is half of 6

1 is half of 2

5 is half of 10

2 is half of 4

4 is half of 8

178 (one hundred seventy-eight)

Working with halves

Draw the other half of each set and show how many there are.

LESSON ACTIVITY

Before Using the Page

- Display six objects. Have a child place a loop of string to enclose one-half of the objects in the set. Ask children if they agree that one-half of the set is enclosed and why. Move the string so that four of the objects are enclosed. Ask, "Is one-half of the set shown now? Why not?" Display eight objects and place a loop of string around four of the objects. Ask if one-half of the set is enclosed.
- Display several sets of objects in orderly and random arrangements. Using loops of string, encircle one-half of some of the sets, and for the other sets encircle parts that are not halves. Ask children to identify which sets show halves and which do not. Have children adjust the loops of string so that all the sets show halves.
- On the display board, place two cutouts inside a set holder having a divider down the middle. Tell the children that this is half of a set of cutouts. Ask what should be done to make the whole set. Ask a child to make the other half of the set. Ask

questions similar to the following:

"Is the same number of objects in each half of the set?"

"How many objects are there in the set?"

"How many objects are there in half of the set?"

Repeat the procedure using other sets of cutouts.

Using the Page

- Read the instruction at the top of the page with the children. Discuss the first set of letters by asking how many letters there are on the mailbox, how many groups of letters there are, how many letters there are in each group, and whether there is the same number of letters in each group. Have the children draw a ring around the first mailbox. Let the children continue on their own for the other exercises.

Discuss what is required for the second part of the page by asking how many letters are shown on the top part of the first mailbox. Say to the children, "If three letters make half a set, how many letters will there be in the other half of the set?" Then ask, "How many letters will there be in the whole set?" Have the children draw the three letters and record the number for the whole set. Then let the children continue on their own.

Draw the other half of each shape.

LESSON OUTCOME

Recognize symmetry in simple shapes:
complete a symmetrical shape

Materials

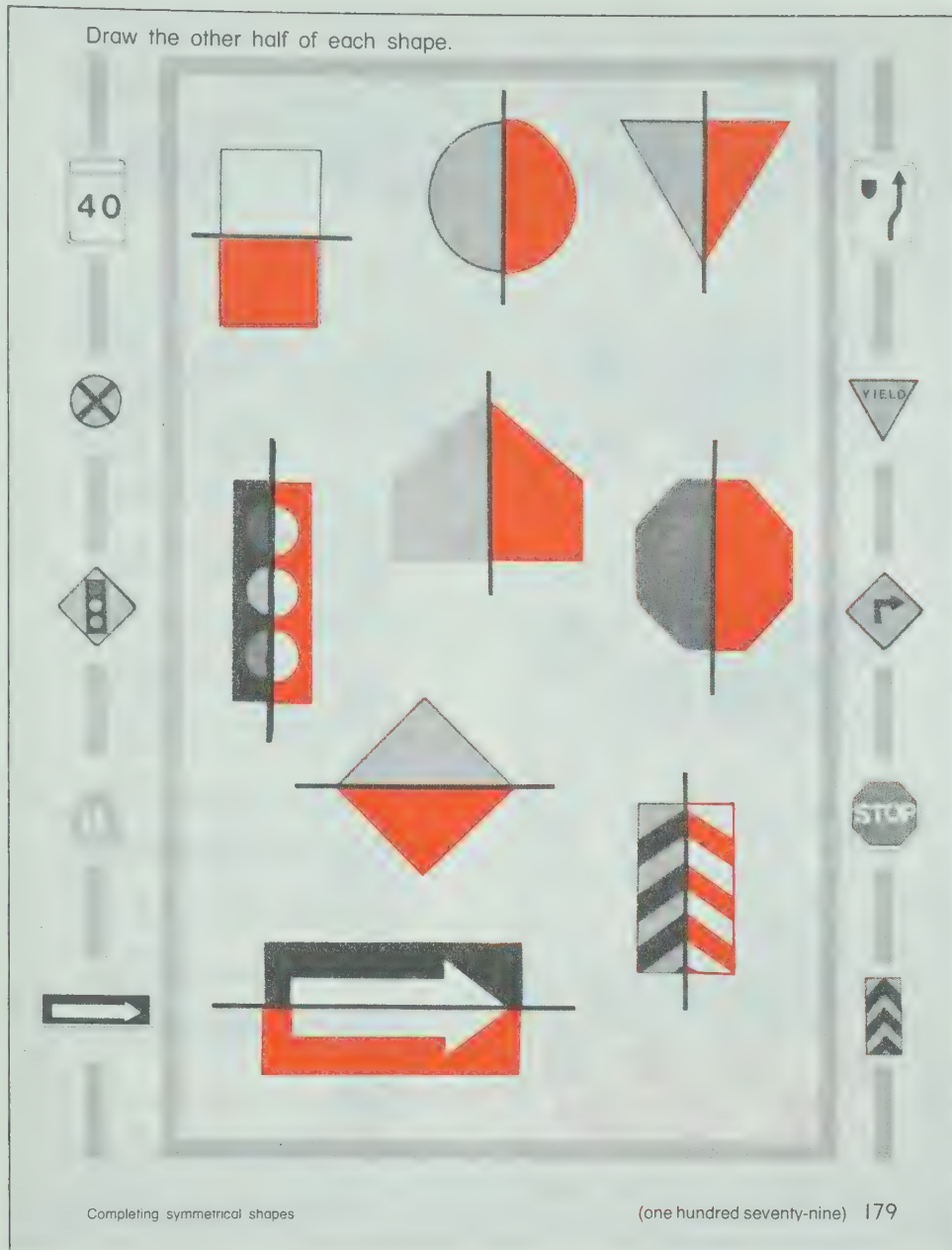
pictures of symmetrical shapes, pieces
of string, crayons for each child

Vocabulary

fold

RELATED ACTIVITIES

- Have the children make a picture using blots of paint inside a folded sheet of paper. The blots can become whatever the child's imagination dictates, for example, a monster. Have the children tell about their pictures.
- If possible, take the children for a walk and look for examples of symmetry in the neighborhood. You may prefer to have the children collect pictures of objects that illustrate symmetry, for example, butterflies, flowers, leaves.
- Have the children use geoboards or geopaper for activities involving symmetry as described on page T249.
- Children find it interesting to stand one mirror on a line of symmetry and observe a picture and its reflection. Sheets of colored Plexiglas make excellent "mirrors" for young children.



Completing symmetrical shapes

(one hundred seventy-nine) 179

LESSON ACTIVITY

Before Using the Page

- A figure is said to be symmetrical if a line divides the figure into two matching parts. Try to avoid using the terms *symmetry* and *symmetrical* with the children. Simply refer to the two equal parts of the shape as matching parts that can be obtained by folding.

Display a picture of a symmetrical object such as a butterfly. By discussion lead the children to see that the picture can be folded so that the two parts match. Use other shapes that can be folded along a horizontal line or a vertical line to demonstrate symmetry.

- Display other symmetrical shapes and have children use a piece of string to indicate where each shape should be folded to obtain two matching parts.
- Draw on the chalkboard one half of several simple shapes with the fold lines indicated. Have children attempt to complete the shapes.

Using the Page

- Discuss with the children the ten traffic signs shown on the sides of the page. Some children may recognize some of the signs and be able to explain what they mean.

Tell the children that they are to draw the other half of each shape. Have them trace over the dotted half for the first shape. Have them point to the picture of a traffic sign that has this shape. For the yellow semicircular shape, have children point to the appropriate picture of the traffic sign and then draw the other half. Continue this procedure for the remaining shapes. Do not expect the children to make accurate drawings of the other halves of the shapes. It is important, however, for them to draw each half approximately the same size as the given half.

LESSON OUTCOME

Complete related basic addition and subtraction facts, sums of 7

Materials

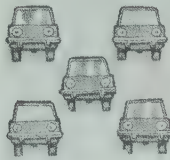
display board and cutouts, yarn or string, counters for each child

RELATED ACTIVITIES

- Have the children make a page for sums of 7 for their "Book of Facts".

$0 + 7 = 7$	$7 - 7 = 0$
$1 + 6 = 7$	$7 - 6 = 1$
$2 + 5 = 7$	$7 - 5 = 2$
$3 + 4 = 7$	$7 - 4 = 3$
$4 + 3 = 7$	$7 - 3 = 4$
$5 + 2 = 7$	$7 - 2 = 5$
$6 + 1 = 7$	$7 - 1 = 6$
$7 + 0 = 7$	$7 - 0 = 7$

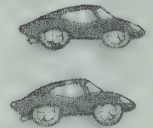
Complete.



$$5 + 2 = \underline{7}$$



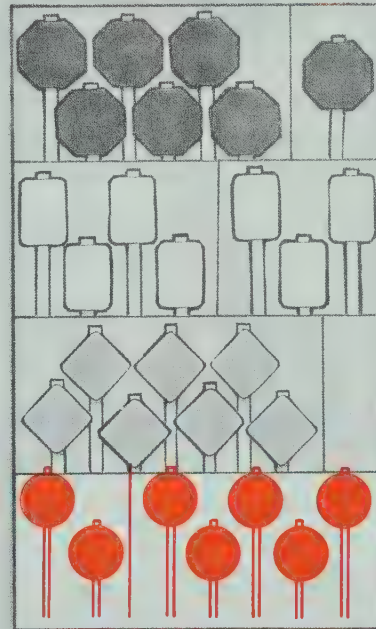
$$7 - 2 = \underline{5}$$



$$2 + 5 = \underline{7}$$



$$7 - 5 = \underline{2}$$



$$6 + 1 = \underline{7}$$

$$1 + 6 = \underline{7}$$

$$7 - 1 = \underline{6}$$

$$7 - 6 = \underline{1}$$

$$4 + 3 = \underline{7}$$

$$3 + 4 = \underline{7}$$

$$7 - 3 = \underline{4}$$

$$7 - 4 = \underline{3}$$

$$7 + 0 = \underline{7}$$

$$0 + 7 = \underline{7}$$

$$7 - 0 = \underline{7}$$

$$7 - 7 = \underline{0}$$

$$2 + 5 = \underline{7}$$

$$5 + 2 = \underline{7}$$

$$7 - 5 = \underline{2}$$

$$7 - 2 = \underline{5}$$

180 (one hundred eighty)

Relating addition and subtraction facts, sums of 7

LESSON ACTIVITY

Before Using the Page

- Place six cutouts on the display board and ask how many there are. Place one more cutout beside the others. Ask a child to state the corresponding addition sentence ($6 + 1 = 7$) and write it on the chalkboard. Ask another child to change the order of the numbers and write the addition sentence ($1 + 6 = 7$) below the first one on the chalkboard.

Opposite $6 + 1 = 7$ write $7 - 1 = \underline{\quad}$. Have a child use the cutouts to illustrate the subtraction sentence and then complete it. Opposite $1 + 6 = 7$ write $7 - 6 = \underline{\quad}$. Have another child use the cutouts to illustrate the subtraction sentence and then complete it. Repeat the procedure for the related facts for $5 + 2$ and $3 + 4$.

- Place seven cutouts on the display board. Have children use a piece of string or yarn to partition the set to illustrate the family of facts for each pair of numbers. For each partitioning, have the children state the number sentences or write them on the chalkboard.



$$6 + 1 = 7$$

$$1 + 6 = 7$$

$$7 - 1 = 6$$

$$7 - 6 = 1$$



$$5 + 2 = 7$$

$$2 + 5 = 7$$

$$7 - 2 = 5$$

$$7 - 5 = 2$$



$$4 + 3 = 7$$

$$3 + 4 = 7$$

$$7 - 3 = 4$$

$$7 - 4 = 3$$



$$0 + 7 = 7$$

$$7 + 0 = 7$$

$$7 - 7 = 0$$

$$7 - 0 = 7$$

Using the Page

- Discuss the pictures with the children to determine whether they can interpret the additive and subtractive situations correctly. Have them complete the corresponding number sentence after each picture has been discussed. Then let the children work independently.

For the last four related facts, have the children draw a set of seven shapes and partition them to show a set of two and a set of five.

Complete.



$$5 + 3 = \underline{8}$$



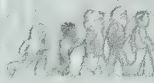
$$8 - 3 = \underline{5}$$



$$3 + 5 = \underline{8}$$



$$8 - 5 = \underline{3}$$



$$6 + 2 = \underline{8}$$

$$8 - 2 = \underline{6}$$

$$2 + 6 = \underline{8}$$

$$8 - 6 = \underline{2}$$



$$7 + 1 = \underline{8}$$

$$8 - 1 = \underline{7}$$

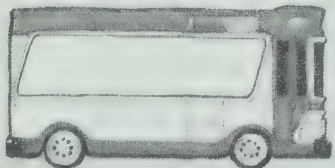
$$1 + 7 = \underline{8}$$

$$8 - 7 = \underline{1}$$



$$4 + 4 = \underline{8}$$

$$8 - 4 = \underline{4}$$



$$3 + 5 = \underline{8}$$

$$8 - 5 = \underline{3}$$

$$5 + 3 = \underline{8}$$

$$8 - 3 = \underline{5}$$

Relating addition and subtraction facts, sums of 8

(one hundred eighty-one) 181

LESSON OUTCOME

Complete related basic addition and subtraction facts, sums of 8

Materials

display board and cutouts, counters for each child

RELATED ACTIVITIES

- Have the children make a page for sums of 8 for their "Book of Facts".

$0 + 8 = 8$	$8 - 8 = 0$
$1 + 7 = 8$	$8 - 7 = 1$
$2 + 6 = 8$	$8 - 6 = 2$
$3 + 5 = 8$	$8 - 5 = 3$
$4 + 4 = 8$	$8 - 4 = 4$
$5 + 3 = 8$	$8 - 3 = 5$
$6 + 2 = 8$	$8 - 2 = 6$
$7 + 1 = 8$	$8 - 1 = 7$
$8 + 0 = 8$	$8 - 0 = 8$

- Have the children work in pairs for writing addition (subtraction) sentences having sums (minuends) of 8. The first child writes a sentence and the second child writes the "undoing" sentence. For example, for the sentence $2 + 4 = 6$ the "undoing" sentence is $6 - 4 = 2$, but $6 - 2 = 4$ is also acceptable; for the sentence $4 - 3 = 1$, the "undoing" sentence is $1 + 3 = 4$, but $3 + 1 = 4$ is acceptable. Have the children use counters to check their work.

LESSON ACTIVITY

Before Using the Page

- Place five cutouts on the display board and ask how many there are. Ask a child to place cutouts beside the others to make a set of eight and state the addition sentence ($5 + 3 = 8$). Have another child write the sentence on the chalkboard. Place three cutouts on the display board and ask how many there are. Have a child place cutouts beside the others to make a set of eight and state the addition sentence ($3 + 5 = 8$). Write it below the first sentence on the chalkboard.

Opposite $5 + 3 = 8$ write $8 - 3 = \underline{\quad}$. Have a child use the cutouts to illustrate the subtraction sentence and then complete it. Opposite $3 + 5 = 8$ write $8 - 5 = \underline{\quad}$. Have another child use the cutouts to illustrate the subtraction sentence and then complete it. Repeat the procedure for the related facts for $2 + 6$ and $4 + 4$.

- Place eight cutouts on the display board. Have children use a piece of string or yarn to partition the set to illustrate the family of facts for each pair of numbers. For each partitioning, have

the children state the number sentences or write them on the chalkboard. (See *Related Activities* for the way in which the related facts for $7 + 1$, $6 + 2$, $5 + 3$, $4 + 4$, and $0 + 8$ may be recorded.)

Using the Page

- Discuss the pictures with the children to determine whether they can interpret the additive and subtractive situations correctly. Have them complete the corresponding number sentence after each picture has been discussed. Then let the children work independently.

For the last four related facts, have the children draw a set of eight heads and partition them to show a set of three and a set of five.

Ask the children in which of the four buses the persons are separated into two equal groups.

LESSON OUTCOME

Recognize that the grouping of addends does not affect the sum

Materials

display board and cutouts, counters for each child

RELATED ACTIVITIES

- Prepare a work sheet involving the matching of number names as shown.

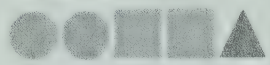
$1 + \boxed{1 + 3}$	$4 + 3$
$2 + \boxed{1 + 4}$	$7 + 2$
$\boxed{3 + 1} + 3$	$2 + 5$
$\boxed{6 + 1} + 2$	$5 + 4$
$5 + \boxed{2 + 2}$	$1 + 4$

Complete the number sentences.



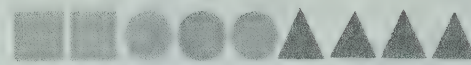
$$2 + 2 + 1 =$$

$$4 + 1 = \underline{5}$$



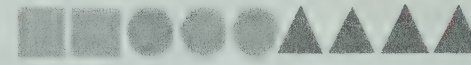
$$2 + 2 + 1 =$$

$$2 + 3 = \underline{5}$$



$$2 + 3 + 4 =$$

$$5 + 4 = \underline{9}$$



$$2 + 3 + 4 =$$

$$2 + 7 = \underline{9}$$

$$1 + 4 + 3 = \underline{8}$$

$$4 + 4 + 2 = \underline{10}$$

$$5 + 4 + 1 = \underline{10}$$

$$3 + 5 + 0 = \underline{8}$$

$$\boxed{4 + 3} + 2 = \underline{9}$$

$$\boxed{2 + 7} + 1 = \underline{10}$$

$$\boxed{1 + 6} + 1 = \underline{8}$$

$$\boxed{3 + 4} + 2 = \underline{9}$$

$$\boxed{3 + 1} + 3 = \underline{7}$$

$$\boxed{5 + 2} + 2 = \underline{9}$$

$$\boxed{4 + 3} + 3 = \underline{10}$$

$$\boxed{5 + 2} + 3 = \underline{10}$$

$$2 + 3 + 3 = \underline{8}$$

$$1 + 3 + 5 = \underline{9}$$

$$2 + 5 + 3 = \underline{10}$$

$$3 + 3 + 2 = \underline{8}$$

$$1 + \boxed{4 + 2} = \underline{7}$$

$$2 + \boxed{6 + 0} = \underline{8}$$

$$7 + \boxed{1 + 2} = \underline{10}$$

$$6 + \boxed{1 + 3} = \underline{10}$$

$$2 + \boxed{2 + 3} = \underline{7}$$

$$5 + \boxed{1 + 3} = \underline{9}$$

$$6 + \boxed{2 + 2} = \underline{10}$$

$$3 + \boxed{6 + 1} = \underline{10}$$

182 (one hundred eighty-two)

Grouping addends in addition sentences

LESSON ACTIVITY

Before Using the Page

- Place three sets of cutouts in separate rows on the display board. Show one in the first set, two in the second, and four in the third. Ask how many cutouts there are in each set. Write the answers on the chalkboard to form the sentence $1 + 2 + 4 =$ _____. Ask how many cutouts there are in the first two sets together. Draw a frame around $1 + 2$ and then write $3 + 4 =$ _____ below the first number sentence in the way shown on page 182. Ask how many cutouts there are in groups of three and four. Complete the addition sentence.

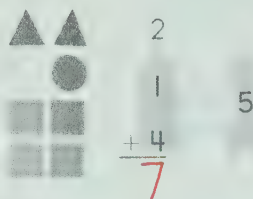
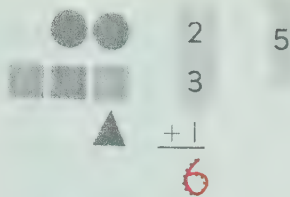
Write the sentence $1 + 2 + 4 =$ _____ again. Point to the set of four and the set of two and ask how many cutouts there are in the two sets together. Draw a frame around $2 + 4$ and write $1 + 6 =$ _____ below the first number sentence. Ask how many cutouts there are in groups of one and six. Complete the addition sentence. Remind the children that the number of cutouts in the three groups together does not change when the groups are joined in a different order.

Repeat with other addition sentences, but have the children draw the frames. Encourage them to “think the sum” rather than write the shorter addition sentence.

Using the Page

- Direct the children’s attention to the first set of shapes. Ask how many yellow shapes there are, how many purple shapes there are, and how many red shapes there are. Ask the children to think of the yellow and purple shapes together. Ask how many there are and how many shapes there are in all. Have them trace over the dotted 5. Then have them think of the purple shapes and the red shape together. Repeat the questions. Follow a similar procedure for the pairs of addition sentences at the right. Then have the children continue on their own. Alert them to the fact that they are to draw frames around pairs of numbers in the last eight rows.

The children may use counters to check their work.



3 1 + 2 <u>6</u>	1 0 + 4 <u>5</u>	2 2 + 3 <u>7</u>	4 2 + 2 <u>8</u>	5 2 + 3 <u>10</u>	6 0 + 4 <u>10</u>
2 3 + 4 <u>9</u>	1 2 + 5 <u>8</u>	4 4 + 2 <u>10</u>	4 3 + 1 <u>8</u>	6 2 + 2 <u>10</u>	1 4 + 5 <u>10</u>
2 5 + 2 <u>9</u>	3 0 + 6 <u>9</u>	5 1 + 3 <u>9</u>	4 1 + 4 <u>9</u>	2 0 + 5 <u>7</u>	6 1 + 2 <u>9</u>
1 3 + 3 <u>7</u>	5 0 + 4 <u>9</u>	3 2 + 3 <u>8</u>	7 0 + 2 <u>9</u>	5 3 + 1 <u>9</u>	3 2 + 5 <u>10</u>
4 2 + 4 <u>10</u>	7 2 + 1 <u>10</u>	2 2 + 5 <u>9</u>	4 1 + 3 <u>8</u>	3 4 + 3 <u>10</u>	5 1 + 2 <u>8</u>

Grouping addends in the vertical form for addition

(one hundred eighty-three) 183

LESSON OUTCOME

Find the sum of three numbers written in vertical form, sums to 10

Materials

display board and cutouts, counters for each child

RELATED ACTIVITIES

Give the children pieces of paper marked to show nine columns with nine squares in each. Have children color squares in a column with different colors in order to indicate sums of 9, for example, 2 red, 3 blue, 4 green, or 1 red, 4 blue, 4 green. Have the children record the numbers in vertical form under each column. This procedure may also be used to review two or more numbers having sums of 7 and 8 (columns of seven and eight squares).

LESSON ACTIVITY

Before Using the Page

• Place cutouts horizontally on the display board to illustrate the number sentence $1 + 2 + 3 = \underline{\quad}$ on the chalkboard. Have one child explain how to find the sum one way. Have another child explain how to find the sum another way. Ask if the two sums are the same. Place another set of identical cutouts vertically on the display board. Write the numbers in vertical form for addition. Have one child suggest how to find the sum.

If the suggestion is to add 1 and 2 first, draw a colored pointer around them. Ask what the sum of 1 and 2 is. Write 3 inside another colored pointer. Ask a child to write the sum.

If the suggestion is to add 3 and 2 first, draw a colored pointer around them. Ask what the sum of 3 and 2 is. Write 5 inside another colored pointer. Ask a child to write the sum.

• Write exercises in vertical form on the chalkboard. Have children practise finding the sums until they feel comfortable with the vertical form.

Using the Page

• Discuss the first exercise at the top of the page with the children. Have them note that when adding downward, the sum of the first two numbers considered is recorded in the arrow pointing down. Similarly, in the second exercise, when adding upward, the sum of the first two numbers considered is recorded in the arrow pointing up. This intermediate step in finding the sum of three numbers will make the work easier for the children.

Have the children trace over the dotted 6 in the first exercise and then complete the second exercise.

• The arrow at the left of the first row indicates that the children are to add downward. When they have completed the row, have them add upward to check their work. Then the procedure is reversed for the second row. For the last row, let the children decide on their own in which direction they will add first.

When the children are completing the exercises, you may wish to have them write the sum of the first two numbers in a way similar to that shown at the top of the page.

LESSON OUTCOME

Identify a set of tens and a set of ones and write the corresponding standard numeral, numbers from 20 to 29

Materials

objects for grouping by tens, pocket chart

Vocabulary

tens' place, ones' place

Background

When the numbers from 10 to 19 were introduced on page 149, we spoke only of "1 ten and 4 more" or "1 ten and 4", for example. Now we begin to look more formally at place value with the terms "tens" and "ones".

RELATED ACTIVITIES

- See page T249 for an activity involving tens and ones for this page.
- Consider the numbers to 29 at random. Display groups of tens and single ones for each number. Ask how many tens and how many ones there are. Have a child write each two-place numeral on the chalkboard.

Complete.

	2 tens and 0 ones are <u>20</u>
	2 tens and 1 one are <u>21</u>
	2 tens and 2 ones are <u>22</u>
	<u>2</u> tens and <u>3</u> ones are 23
	2 tens and 4 ones are 24
	<u>2</u> tens and <u>5</u> ones are <u>25</u>
	<u>2</u> tens and <u>6</u> ones are 26
	2 tens and 7 ones are <u>27</u>
	<u>2</u> tens and <u>8</u> ones are 28
	<u>2</u> tens and <u>9</u> ones are 29

184 (one hundred eighty-four)

Introduction to the numbers 20 to 29 using tens and ones

LESSON ACTIVITY

Before Using the Page

- Display a group of ten objects and ask a child to check how many there are. Place a single object beside the group. Note that now there is "one ten and one". Display a pocket chart having two pockets, one labelled "tens" and the other labelled "ones". (See page xxxi.) Explain that the tens' pocket or *the tens' place* is for holding groups of ten, and the ones' pocket or *the ones' place* is for holding single objects. Have a child place the group of ten in the tens' place and the single object in the ones' place. On the chalkboard, draw a place-value chart like the one shown below.

tens	ones	numeral
1	0	10

Ask again how many there are in each place of the pocket chart. Ask a child to make the entries in the chart on the chalkboard and to write the numeral 11.

Place one more single object in the ones' place of the pocket

chart and repeat the procedure suggested above. Continue until 19 has been written in the chart.

Ask a child to place one more single object in the ones' place. Ask how many there are in the ones' place now. Lead the children to realize that the ten single objects can be made into a group of ten and moved to the tens' place. There are now two groups of ten and zero single objects. The children already know how to write the numeral 20 for "two tens". Ask what special name there is for two tens (twenty). Write the entries for 20 in the chart.

Continue to add a single object each time until the chart on the chalkboard includes 21 to 29. Then review the numbers to 29 at random.

Using the Page

- Read the words and discuss the first exercise with the children. Have them trace over the dotted 20. Have the children write the number of tens and the number of ones and / or the two-place numeral for each picture. For illustrating 24, 26, and 29, have the children draw circles to represent the beads; it is not necessary to color the beads.

Complete.

3 tens and 0 ones are 30

3 tens and 1 one are 31

3 tens and 7 ones are 37

3 tens and 4 ones are 34



3 tens and 9 ones are 39



3 tens and 5 ones are 35

3 tens and 2 ones are 32

3 tens and 8 ones are 38



3 tens and 3 ones are 33

3 tens and 6 ones are 36

Introduction to the numbers 30 to 39 using tens and ones

(one hundred eighty-five) 185

LESSON OUTCOME

Identify a set of tens and a set of ones and write the corresponding standard numeral, numbers from 30 to 39

Materials

objects for grouping by tens, pocket chart, Unifix cubes

RELATED ACTIVITIES

- Have the children use Unifix cubes to show particular numbers. For 36, a child will choose three groups of ten cubes and six single cubes. Repeat several times.
- Now that the children have had experiences with the numbers to 39, you may wish to begin work with the calendar. See page T309 for suggestions that can be considered at this time. You may wish to make copies of page T346 so that each child may have a calendar.

LESSON ACTIVITY

Before Using the Page

- Display two tens and different numbers of single objects for reviewing the numbers from 20 to 29. Ask how many tens and how many ones there are for each number. Have a child make a final statement for each number; for example, "Two tens and four ones are twenty-four." Have another child write the numeral on the chalkboard.
- Use the pocket chart and the place-value chart on the chalkboard as suggested on page T238. Place two groups of ten in the tens' place and eight single objects in the ones' place. Ask how many tens and ones there are and have a child make the entries for 28 in the chart on the chalkboard. Place one more single object in the one's place and repeat the procedure for 29.

Place one more single object in the ones' place. Ask how many there are in the ones' place now. Lead the children to realize that the ten single objects can be made into a group of ten and moved to the tens' place. There are now three groups

of ten and zero single objects. The children already know how to write the numeral 30 for "three tens". Ask what special name there is for three tens (thirty). Write the entries for 30 in the chart on the chalkboard.

Continue to add a single object each time until the chart on the chalkboard includes 31 to 39. Have the children take turns saying the numbers from 29 to 39.

- Consider the numbers to 39 at random. Display groups of tens and single ones for each number. Ask how many tens and how many ones there are. Have a child write each two-place numeral on the chalkboard.

Using the Page

- Read the words and discuss the first exercise with the children. Have them trace over the dotted 30. Have the children write the number of tens and the number of ones and / or the two-place numeral for each picture. For illustrating 39, 35, and 33, have the children draw squares to represent the cubes; it is not necessary to color the shapes.

LESSON OUTCOME

Identify a set of tens and a set of ones and write the corresponding standard numeral, numbers from 40 to 49

Materials

objects for grouping by tens, pocket chart, Base Ten Blocks

RELATED ACTIVITIES

If you do not have Base Ten Blocks, you may wish to have the children make "strips" and "units" from graph paper for working with tens and ones. They can paste copies of page T341 or T342 onto cardboard and then cut out strips of ten squares, and single squares. Each child will be able to have a set of "strips" and "units" for working independently.

- Have the children use dimes and pennies to show numbers from 40 to 49. You may wish to have the children draw dimes and pennies to show amounts from 40¢ to 49¢. This idea may also be used to review the numbers from 20 to 39.

Complete.		
	4 tens and 0 ones are	<u>40</u>
	4 tens and 2 ones are	<u>42</u>
	4 tens and 7 ones are	<u>47</u>
	<u>4</u> tens and <u>5</u> ones are	<u>45</u>
	4 tens and 3 ones are	<u>43</u>
	<u>4</u> tens and <u>8</u> ones are	<u>48</u>
	<u>4</u> tens and <u>1</u> one are	<u>41</u>
	<u>4</u> tens and <u>4</u> ones are	<u>44</u>
	<u>4</u> tens and <u>6</u> ones are	<u>46</u>
	4 tens and <u>9</u> ones are	<u>49</u>

186 (one hundred eighty-six) Introduction to the numbers 40 to 49 using tens and ones

LESSON ACTIVITY

Before Using the Page

- Display three tens and different numbers of single objects for reviewing the numbers from 30 to 39. Ask how many tens and how many ones there are for each number. Have a child make a final statement for each number; for example, "Three tens and six ones are thirty-six." Have another child write the numeral on the chalkboard.
- Use the pocket chart and the place-value chart on the chalkboard as suggested on page T238 to build up the numbers from 35 to 39. When the tens and ones are displayed for 39, include one more single object. Have a child make the ten single objects into a group of ten and place it in the tens' place of the pocket chart. There are now four groups of ten and zero single objects. The children already know how to write the numeral 40 for "four tens". Ask what special name there is for four tens (forty). Write the entries for 40 in the chart on the chalkboard.

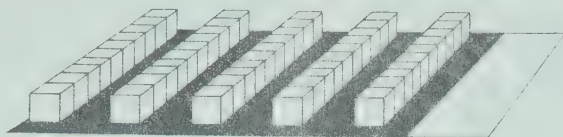
Continue to add a single object each time until the chart on the chalkboard includes 41 to 49. Have the children take turns saying the numbers from 39 to 49.

- Consider the numbers to 49 at random. Display groups of tens and single ones for each number. Ask how many tens and how many ones there are. Have a child write each two-place numeral on the chalkboard.
- Have the children use groups of ten and single objects, such as Base Ten Blocks, to show particular numbers. For 43, a child will choose four groups of ten and three single objects. Repeat several times.

Using the Page

- Read the words and discuss the first exercise with the children. Have them trace over the dotted 40. Have the children write the number of tens and the number of ones and / or the two-place numeral for each picture. For illustrating 43, 41, and 49, have the children draw squares to represent the cubes; it is not necessary to color the shapes.

Complete.



5 tens and 0 ones are 50

3 tens and 9 ones are 39

2 tens and 7 ones are 27

3 tens and 6 ones are 36

4 tens and 5 ones are 45

2 tens and 2 ones are 22

5 tens and 0 ones are 50

4 tens and 4 ones are 44

3 tens and 1 one are 31

2 tens and 9 ones are 29

4 tens and 6 ones are 46

3 tens and 0 ones are 30

2 tens and 8 ones are 28

3 tens and 7 ones are 37

4 tens and 8 ones are 48

2 tens and 3 ones are 23

Reinforcement of the numbers 20 to 50 using tens and ones

(one hundred eighty-seven) 187

OBJECTIVE

Demonstrate an understanding of the numbers to 50

Materials

objects for grouping by tens, numeral cards for 20 to 50

RELATED ACTIVITIES

- Play the game "Traders" as described on page T249. Children enjoy playing "Traders" by themselves, seeing how many beads they can obtain. Be watchful for the child who plays long enough to gather ten or more beads. That child may be ready to extend the game to include an object that replaces ten beads.

LESSON ACTIVITY

Before Using the Page

- Display four tens and different numbers of single objects for reviewing the numbers from 40 to 49. Ask how many tens and how many ones there are for each number. Have a child make a final statement for each number; for example, "Four tens and two ones are forty-two." Have another child write the numeral on the chalkboard.

Display four tens and nine ones. Have a child include one more single object and make the ten single objects into a group of ten. There are now five groups of ten and zero single objects. The children already know how to write the numeral 50 for "five tens". Ask what special name there is for five tens (fifty).

- Have prepared a set of cards showing the numerals 20 to 50. Give one or more cards to each child. Ask each child to explain the meaning of her/his numeral(s). Then ask the children having the cards for the numbers that are one greater than 19, 29, 39, and 49 to stand. Have the children, in turn, say the names

of their numbers. Continue this activity with other instructions, if you wish.

- Display groups of tens and single objects. Have a child illustrate 13. Ask what change must be made to show 23 (another group of ten is needed). Have a child illustrate 25, and ask another child to make the change to show 35. Continue with other examples.

Have a child illustrate 12 and another child illustrate 21. Have other children illustrate 13 and 31, and then 14 and 41. Have children explain what each numeral means by referring to tens and ones.

Using the Page

- Read the words and discuss the first exercise with the children. Have them trace over the dotted 50. There are two types of exercises on this page. Guide the children in reading the words and realizing what is required. Allow children to use objects for grouping if they need them. However, at this stage, the children should begin to concentrate on the numeral and think what it means rather than rely on manipulating objects.

LESSON OUTCOME

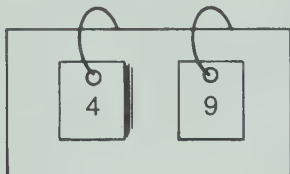
Complete the sequence of numbers to 50; complete basic addition and subtraction facts, sums and minuends to 10

Materials

chart for the numbers 1 to 50, numeral cards for 1 to 50, crayons for each child

RELATED ACTIVITIES

- Prepare a flip chart out of cardboard and rings. Make two sets of small cards showing the numerals from 0 to 9. Punch a hole in each card and place the two sets in order on the two rings. Have children adjust the cards to show the numeral for three tens and five ones, twenty-nine, the number after 18, and so on.



Show the missing numbers.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Complete the number sentences.

$4 + 5 = 9$

$6 + 4 = 10$

$3 + 3 = 6$

$3 + 2 = 5$

$7 + 2 = 9$

$4 + 3 = 7$

$2 + 8 = 10$

$6 + 0 = 6$

$1 + 4 = 5$

$6 + 3 = 9$

$3 + 7 = 10$

$5 + 2 = 7$

$2 + 6 = 8$

$1 + 3 = 4$

$4 + 4 = 8$

$10 - 5 = 5$

$9 - 1 = 8$

$7 - 3 = 4$

$6 - 2 = 4$

$8 - 5 = 3$

$4 - 2 = 2$

$7 - 2 = 5$

$6 - 3 = 3$

$7 - 0 = 7$

$9 - 5 = 4$

$5 - 2 = 3$

$6 - 1 = 5$

$8 - 2 = 6$

$7 - 6 = 1$

$9 - 3 = 6$

188 (one hundred eighty-eight)

Ordering the numbers to 50: addition and subtraction practice

LESSON ACTIVITY

Before Using the Page

- Prepare a large chart marked to show 50 squares like the one on page 188, and a set of cards showing the numerals from 1 to 50. (A number board as described on page T325 is ideal for this activity.) Ask the children to look at the chart. Start at the first square and have the children count in unison as you point to each square in turn. Lead them to discover that the last column of squares will have multiples of ten. Also have them discover that the number in the square below any square has one more ten and the same number of ones.

Shuffle the cards and have the children take turns in drawing a card and placing it in the correct square on the chart.

- Display three tens and four ones. Ask how many tens there are, how many ones there are, what the number is, and what number comes after (before) it. Repeat the questions for several other groups of tens and single ones.

Using the Page

- Read the instruction at the top of the page to the children. Have them print the numerals to complete the chart. Ask them to say each number silently to themselves as they work.

After the children have completed the chart, have them follow instructions similar to the following:

1. Color blue all the squares that show tens and zero ones.
2. Color red all the squares that show five ones, and tens and five ones.
3. Mark an X on the number between 26 and 28.
4. Mark a \checkmark on the number after 37.
5. Ring the number before 43.

You may wish to have the children check their answers as you proceed.

- For the addition and subtraction sentences, you may wish to challenge the children to complete a given number of sentences as quickly as possible. If you know your fast workers and slow workers, group them accordingly and assign, say, ten sentences to be completed within a given time.

What number comes before ?

32 33
10 11
39 40

45 46
30 31
19 20

29 30
48 49
40 41

9 10
49 50
20 21

What number comes after ?

2 3
19 20
40 41

4 5
29 30
26 27

21 22
37 38
11 12

15 16
49 50
17 18

What number comes between ?

1 2 3
23 24 25
40 41 42

17 18 19
27 28 29
27 38 39

15 16 17
29 30 31
48 49 50

19 20 21
35 36 37
46 47 48

What time is it ?



12 o'clock



3 o'clock



8 o'clock



6 o'clock

Identifying numbers before, after, and between numbers to 50

(one hundred eighty-nine) 189

LESSON OUTCOME

Identify numbers before, after, and between numbers to 50

Materials

number line, demonstration clock

Vocabulary

later, earlier

RELATED ACTIVITIES

- Have the children play the game "I'm Thinking of a Number". The leader may say, "I am thinking of the number that comes between 32 and 34. What is the number?" The child who answers correctly becomes the leader.
- Have the children work with their paper-plate clock faces. Set the demonstration clock at 9 o'clock. Have the children set their clocks to show one hour *later*. Then have them set their clocks to show one hour *earlier*.

Set a clock at a certain hour and ask the children to set their clocks a given number of hours earlier than or later than the time shown. You may wish to have children work in pairs. If so, each child takes a turn being the leader, setting the hour, and stating the condition for the hour to be shown on the second clock.

LESSON ACTIVITY

Before Using the Page

• Mark the numerals to 50 on the number line described on page T201. Ask questions of the following types:

"What number comes before 39?"

"What number comes after 49?"

"What number comes between 11 and 13?"

Continue with questions involving the concepts *greater than* and *less than*.

"Name two numbers greater than 35."

"Name two numbers less than 24."

"Name a number greater than 26 and less than 30."

"Is 43 greater than or less than 34?"

"Is 12 greater than or less than 21?"

"What number is ten greater than 13?"

"What number is ten less than 42?"

• Have children count aloud by twos to 24 by pointing to the numerals on the number line. Have other children continue to 50. In a similar way, have children count by fives and tens using the number line.

- To review telling time, to the hour, set your demonstration clock at 4 o'clock and ask a child what time is shown. Repeat for other times, to the hour.

Using the Page

- Read each instruction with the children to ensure they know that they are to record the number that comes before each number given in the first set, the number that comes after each number given in the second set, and the number that comes between the numbers of each pair given in the third set.
- For the four clock faces at the bottom of the page, the children are to write each time, to the hour.

After the children have recorded the times, present problems similar to the following:

1. This morning I got up two hours earlier than the time shown on the third clock face. What time did I get up?
2. I plan to meet a friend two hours later than the time shown on the second clock face. At what time will I meet my friend?

LESSON OUTCOME

Recognize a quarter and know that it is equivalent to 25 pennies and its value is 25 cents; use quarters, dimes, nickels, and pennies for counting

Materials

demonstration number line, real money, play money, or coin cutouts from copies of page T337

Vocabulary

quarter, fives

RELATED ACTIVITIES

- Prepare work sheets of number lines having 11 dots. (See page T336.) Have the children label the points on the first number line by fives from 0 to 50 and say the numbers to themselves as they move along the number line.

Have the children start at 10 on the number line, count by tens to 50, and ring each number named. Continue with other instructions.

quarter
 25 cents 25¢

Complete.

190 (one hundred ninety)

Introduction to the quarter; counting with coins

LESSON ACTIVITY

Before Using the Page

- Review the names of the coins used earlier (penny, nickel, and dime). Review the values of the coins and the equivalent values.
- Have the children use dimes for counting by tens to 50.
- For counting by fives, draw a number line on the chalkboard. Show points only for 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, and 50. Have children point to the numerals and say the number names.
- Have children place nickels or dimes at each point on the number line and count, using the corresponding counting numbers. It is the custom when counting money to start with the greatest value and then proceed to lesser values. For example, for the value of three dimes and four nickels, the counting would be "10, 20, 30, 35, 40, 45, 50".
- Introduce the *quarter* and explain that its value is twenty-five cents. Have a child place a quarter at the appropriate place on the number line. Place dimes and nickels in their appropri-

ate places after the quarter and have children read the counting numbers from the number line. For example, one quarter, two dimes, and one nickel would be counted as "25, 35, 45, 50". Repeat for other combinations of dimes and nickels with the quarter.

When the children appear comfortable with a quarter, dime(s), and nickel(s), introduce examples with up to four pennies and have the children count the values. For example, one quarter, one dime, and four pennies would be counted as "25, 35, 36, 37, 38, 39".

Using the Page

- Direct the children's attention to the picture of the quarter and read the words with them. Discuss the first number line with the children. Have a child read the numbers shown on the number line. Ask how many dimes there are above the number line. Have a child point to the dimes and count by tens. Have the children trace over the dotted 10 and the dotted 20 and then complete the sequence. Let the children continue on their own.

Complete.

Working with amounts to 50 cents

(one hundred ninety-one) 191

LESSON OUTCOME

Determine the value of a set of coins, amounts to 50 cents; show sets of coins for amounts to 50 cents

Materials

real money, play money, or coin cutouts from copies of page T337, cards showing prices to 50¢

RELATED ACTIVITIES

- Have the children use real or play money to determine how many different ways they could choose a set of coins for a given amount. Tell them that they may not use more than ten coins for any given amount.

You may wish to make a work sheet, as shown, on which the children draw the coins after they have determined those that can be used. Rather than draw the coins, you may prefer to have the children paste on coin cutouts from copies of page T337.

	10¢	5¢	1¢	1¢	1¢
	5¢	5¢	5¢	1¢	1¢
35¢					
42¢					

LESSON ACTIVITY

Before Using the Page

- Review the fact that a quarter has the value 25 cents. Have children display sets of coins that have a value of 25 cents. Ask how many pennies have the same value as a quarter. Ask how many nickels have the same value as a quarter.
- Display a quarter, a dime, and a nickel. Have a child point to each coin in turn and say, "25, 35, 40". Repeat several times using various combinations of dimes, nickels, and pennies (amounts to 50 cents).
- Display several cards showing, for example, 16¢, 23¢, 34¢, and 41¢. Have children, in turn, select coins that have the value indicated on a card. Encourage children to suggest other ways of showing each amount. For example, for 23¢, one may show two dimes and three pennies, or one dime, two nickels, and three pennies, or four nickels and three pennies.
- Place a dime and a nickel in a box. Tell the children that you have two coins worth 15 cents in the box. Ask them to guess

what two coins there are in the box. Repeat several times with different coins and different numbers of coins.

Using the Page

- Direct the children's attention to the set of coins matched with the first parking meter. Ask what the value of the set of coins is. Have the children trace over the dotted 38. Let the children work on their own to show the values of the four other sets of coins.

For the last three exercises, have the children draw sets of coins that have the values given on the parking meters. Remind the children to choose the fewest coins possible. Give individual help with real coins to those children who have difficulty. You may wish to have some children refer to the number lines on page 190, if necessary.

LESSON OUTCOME

Identify three-dimensional shapes in the environment

Materials

three-dimensional models in wood or plastic, a soup can and a log of wood

RELATED ACTIVITIES

- Play the game “What Am I?” with the children. Place the three-dimensional models in front of the children. Make a statement about one of the models. If someone can identify the model from the first clue, he / she wins three points. If a second clue is needed before the model is identified, two points are awarded for a correct response. If a third clue is needed for the model to be correctly identified, one point is awarded. For example, a first clue for the cone might be, “I have only one face to stand on? What am I?” The second clue might be “I can roll but not in a straight path. What am I?”
- If possible, take the children for a walk in the neighborhood and look for things that suggest the basic three-dimensional shapes. You may prefer to have the children collect pictures of objects that suggest the basic shapes.

Answers will vary.

LESSON ACTIVITY**Before Using the Page**

- Display a cone, a cube, a cylinder, a rectangular prism, a triangular prism, a pyramid, and a sphere. Discuss corners and faces by having the children identify the models that have corners and faces, the ones that have no corners, the one that has two circular faces, the one that has six square faces, the one that has one circular face, the ones that can roll, and the one that has only a curved surface.
- Display two of the models. By asking questions have the children describe how the models are alike and how they are different. Ask what objects in everyday life have shapes like the two on display. Repeat for other pairs of models.
- Display a soup can. Have children choose the model that corresponds to the shape of the can. Have children make observations about the can. If possible, display a log of wood beside the can. Lead the children to see that they have the same shape, but the can is used to hold things.

- Have the children trace around the faces of the three-dimensional models and name the shapes of the outlines. By now the words *circle*, *rectangle*, *square*, and *triangle* should present no difficulty. While the children work, ask questions about the faces of the models; for example, which model has only one circular face, which model has two circular faces, which model has six square faces, and so on.

Using the Page

- Have the children look at each of the shapes in turn and ask what familiar object the shape reminds them of. For example, the cone at the upper left will suggest an ice cream cone to most children. Lead the children to suggest more than one possible object for each shape. Then have the children draw details on each shape to make it look like one of the familiar objects mentioned. Encourage the less creative children by asking them leading questions that will give them some ideas from which to start.

OBJECTIVE

Complete basic addition and subtraction facts, sums and minuends to 10

Materials

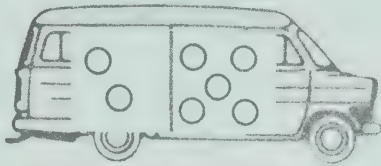
counters such as transparent bingo chips, overhead projector

RELATED ACTIVITIES

- Give each child a five-by-five section of graph paper cut from of page T342. Have the children the numbers in the squares as shown below. Then have the children find sums by adding horizontally, vertically, and diagonally.

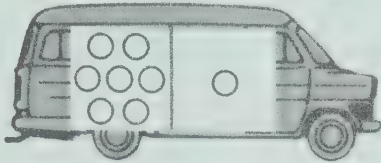
				9
	1	2	3	
8	5	1	2	8
	3	4	3	
9				

Write the related facts.



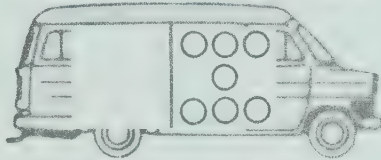
$$\begin{array}{r} 2 + 5 = 7 \\ 7 - 5 = 2 \end{array}$$

$$\begin{array}{r} 5 + 2 = 7 \\ 7 - 2 = 5 \end{array}$$



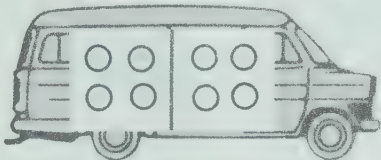
$$\begin{array}{r} 7 + 1 = 8 \\ 8 - 1 = 7 \end{array}$$

$$\begin{array}{r} 1 + 7 = 8 \\ 8 - 7 = 1 \end{array}$$



$$\begin{array}{r} 0 + 7 = 7 \\ 7 - 7 = 0 \end{array}$$

$$\begin{array}{r} 7 + 0 = 7 \\ 7 - 0 = 7 \end{array}$$



$$4 + 4 = 8$$

$$8 - 4 = 4$$

Add.

$$\begin{array}{r} 1 + 2 + 1 = 4 \\ 4 + 0 + 2 = 6 \end{array}$$

$$\begin{array}{r} 2 + 1 + 2 = 5 \\ 3 + 2 + 1 = 6 \end{array}$$

$$\begin{array}{r} 2 + 2 + 3 = 7 \\ 0 + 5 + 4 = 9 \end{array}$$

$\begin{array}{r} 6 \\ 2 \\ +1 \\ \hline 9 \end{array}$	$\begin{array}{r} 4 \\ 3 \\ +3 \\ \hline 10 \end{array}$	$\begin{array}{r} 5 \\ 0 \\ +5 \\ \hline 10 \end{array}$	$\begin{array}{r} 3 \\ 2 \\ +4 \\ \hline 9 \end{array}$	$\begin{array}{r} 1 \\ 1 \\ +8 \\ \hline 10 \end{array}$	$\begin{array}{r} 2 \\ 4 \\ +3 \\ \hline 9 \end{array}$
$\begin{array}{r} 1 \\ 1 \\ +1 \\ \hline 3 \end{array}$	$\begin{array}{r} 2 \\ 2 \\ +2 \\ \hline 6 \end{array}$	$\begin{array}{r} 3 \\ 3 \\ +3 \\ \hline 9 \end{array}$	$\begin{array}{r} 1 \\ 3 \\ +1 \\ \hline 5 \end{array}$	$\begin{array}{r} 1 \\ 5 \\ +1 \\ \hline 7 \end{array}$	$\begin{array}{r} 1 \\ 7 \\ +1 \\ \hline 9 \end{array}$

Addition and subtraction practice: sums and minuends to 10

(one hundred ninety-three) 193

LESSON ACTIVITY

Before Using the Page

- Display seven counters on the overhead projector. Ask a child to separate the counters into two groups and tell how many there are in each group. Then ask the children to state the four related facts. Write the number sentences on the chalkboard. Group the seven counters together again and ask a child to separate them into two different groups. Have children write the four related sentences on the chalkboard. Repeat the procedure for several number combinations for seven. Then adapt the activity for number combinations for eight.
- Show the number sentence $4 + 1 + 2 = \underline{\quad}$ on the overhead projector and place counters horizontally on the overhead projector to illustrate the sentence. Have children explain two ways for finding the sum. Ask children which of the two ways they prefer for finding the sum. Show the addition $3 + 2 + 1$ in vertical form on the overhead projector and follow a similar procedure with counters.

Using the Page

- Direct the children's attention to the blue van at the top of the page. Ask how many tires there are in the first group and have the children trace over the dotted 2. Ask how many there are in the second group and have the children trace over the dotted 5. Then ask how many tires there are in all and have the children trace over the dotted 7. Use a similar procedure for the related subtraction sentence $7 - 5 = 2$. Point out that there will be one more addition sentence and one more subtraction sentence for the numbers 2, 5, and 7.

Discuss the other sets of tires to ensure that the children understand what numbers are involved. Then let them work independently.

OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

Materials

ten counters for each child

RELATED ACTIVITIES

- Because place value is such an important topic, you may wish to play the game "From Ten to Ten", described on page T249, to give the children more practice in working with tens and ones.

Add. $4 + 2 + 3 = \underline{9}$

$5 + 4 + 0 = \underline{9}$

$3 + 4 + 3 = \underline{10}$

$5 + 1 + 2 = \underline{8}$

$6 + 2 + 1 = \underline{9}$

$3 + 2 + 3 = \underline{8}$

$\begin{array}{r} 3 \\ 2 \\ +5 \\ \hline 10 \end{array}$

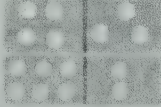
$\begin{array}{r} 6 \\ 2 \\ +2 \\ \hline 10 \end{array}$

$\begin{array}{r} 4 \\ 3 \\ +1 \\ \hline 8 \end{array}$

$\begin{array}{r} 1 \\ 3 \\ +3 \\ \hline 7 \end{array}$

$\begin{array}{r} 2 \\ 4 \\ +2 \\ \hline 8 \end{array}$

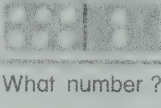
Write the related facts.


 $4 + 3 = 7$

$7 - 3 = 4$

$3 + 4 = 7$

$7 - 4 = 3$


 $6 + 2 = 8$

$8 - 2 = 6$

$2 + 6 = 8$

$8 - 6 = 2$

What number ?



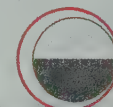
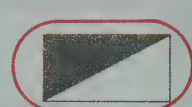
2 tens 3 ones 23

4 tens 7 ones 47

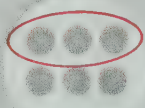
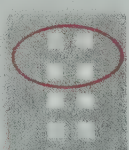

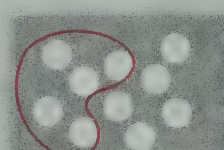
35 3 tens 5 ones

26 2 tens 6 ones

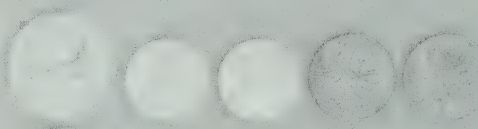
Ring the shapes that show one-half.


Ring one half of each set.

How much ?



47 ¢



36 ¢

194 (one hundred ninety-four) CHECKUP

LESSON ACTIVITY

Before Using the Page

- Review some of the concepts introduced in this unit: the numbers to 50, addition with three addends (sums to 10) in horizontal and vertical form, related addition and subtraction facts for sums of 7 and 8, the idea of one-half of a whole and one-half of a set of objects, symmetry, sharing between two, and amounts of money to 50 cents.

For reviewing a concept, choose one of the preliminary activities suggested for teaching that particular concept. You may wish to adapt some of these activities according to the strengths and weaknesses of the children in the group.

Using the Page

- Discuss with the children the different types of exercises to ensure that they know what to do for this *Checkup*. Then let the children work independently. Observe the children as they work and give individual help to any child who is having

difficulty. Note the difficulties encountered so that extra help can be given when time is available.

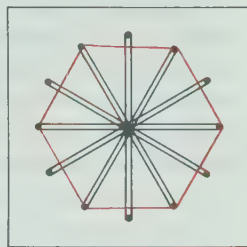
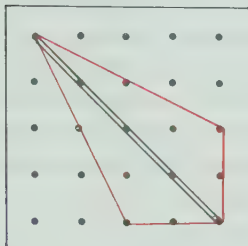
Each child should have a set of ten counters. Even though many children may not need the counters, they may wish to use them to check their work.

Games and Activities

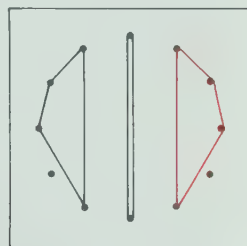
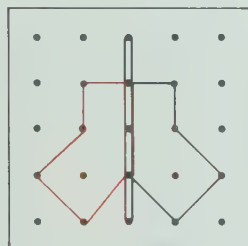
Symmetry Activities (for page 179)

Use geoboards or geopaper prepared from copies of page T332. The twelve-point geoboard is also suitable. (See page T23.)

1. Show a shape on a demonstration geoboard. Have children copy the shape and show a line of symmetry. Include shapes for which there is more than one line of symmetry.



2. Have children work in pairs using one geoboard on which a rubber band indicates a line of symmetry. One child uses a rubber band to make a shape on one side of the line of symmetry. The other child either stretches the rubber band or uses another rubber band to form the other half of the shape on the other side of the line of symmetry.

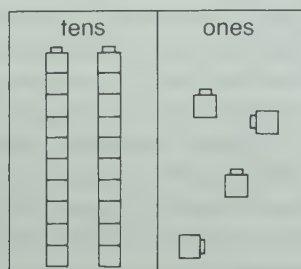


Making Tens (Activity for page 184)

Provide each child with a large sheet of paper marked into two columns for tens and ones, and a box of Unifix cubes or other objects for grouping.

Explain that the ones' column is only for single cubes and that no cubes are to be joined in this column. The tens' column is only for "trains" formed by joining ten cubes; no single cubes are to be placed here.

At a given signal, such as the ringing of a bell, have the children take one cube from the box and place it in the ones' column. Ask a child to tell the story after each cube is placed. For example, the story illustrated is "two tens four ones". When a tenth cube is placed in the ones' column, the ten ones are joined to form a "train", which is then placed in the tens' column. Continue this process as long as the children appear interested.



For a variation of this activity, reverse the procedure and have the children remove one cube from the ones' column after each signal. When there are no cubes in the ones' column, do not tell the children to regroup one ten as ten ones; try to elicit this idea from them.

Traders (Game for page 187)

Materials

at least 50 of each of two different objects, for example, straws and beads
two dice, each marked from 0 to 5

Rules

1. The first player throws the dice, adds the two numbers together, and takes that number of straws.
2. When a player collects ten straws, they may be exchanged for one bead.
3. The game continues until one player has five beads (50 points).
4. The player must count the beads by saying, "ten, twenty, thirty, forty, fifty" before he/she will be recognized the winner.

From Ten to Ten (Game for page 194)

Materials

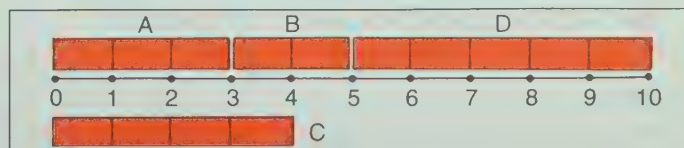
two dice, one marked 0, 0, 1, 2, 3, 4 and the other marked 1, 1, 2, 3, 4, 5

a number line showing from 0 to 10 for each player
three sets of strips from one to nine units in length, where the units correspond to those on the number line, for each player
special markers 10 for each completed ten-strip

Rules

1. Each player in turn tosses the dice, finds the sum of the two numbers, chooses the strip that corresponds to the sum (if the dice show 1 and 3, the strip four units long is needed), and places the strip on the number line.
2. As the game continues, the players place strips on the number line in an attempt to reach 10 and earn a special marker.
3. If a strip cannot be used to complete a ten-strip, it forms the beginning of a new ten-strip.
4. When the game is over, the player with the most markers is the winner.
5. The other players should state their scores as tens and ones.

The results of the first four turns for one player might be as shown below.



The results of throw A were 21; the results of throw B were 02; the results of throw C were 13; the results of throw D were 32. Because the strip for throw D could be used to complete a ten-strip, it was used to replace strip C. Strip C was placed in readiness for making another ten-strip.

Unit 10 Overview

In this unit counting by twos is presented using both even numbers and odd numbers, but greater attention is given to the even numbers. Children discover the sums for repeated twos up to 9 twos. Related addition and subtraction facts are extended to sums and minuends of 9 and 10. Exercises requiring the writing of addition sentences to represent pictured actions of joining sets, and subtraction sentences to represent actions of separating are included. Numeration is extended to two-place numerals for numbers to 99 and attention is directed to the changes that occur in both the tens' and ones' digits when 1 is added to such numbers as 19, 29, 39, . . . , 99. The numbers are considered in sequence to 100 and numbers are identified that occur before, after, or between whole numbers to 100. More practice is provided with amounts of money and the use of coins for values to 50 cents. Measurement of capacity is considered in terms of non-standard units. Line segments are drawn between dots to create two-dimensional shapes, which are then examined to discover the number of sides and the number of corners of each. The *Checkup* includes exercises to assess knowledge and skills concerning even and odd numbers, addition and subtraction facts, two-place numerals, and values of given sets of coins.

Unit Outcomes

Number

- count by twos to 50
- determine the number of objects in one or more groups of two, to 9 twos
- write a number sentence to describe an additive or subtractive situation
- complete related basic addition and subtraction facts, sums of 9 and 10
- identify a set of tens and a set of ones and write the corresponding standard numeral, numbers to 99
- interpret a place-value chart for two-place numerals
- count and order the numbers to 100
- identify numbers before, after, and between whole numbers to 100
- identify a number one greater than (less than) or two greater than (less than) a given number, numbers to 100
- complete basic addition and subtraction facts, sums and minuends to 10

Measurement

- determine the values of sets of quarters, dimes, nickels, and pennies for amounts to 50 cents
- select the coins required for amounts to 50 cents
- show the coins required for amounts to 50 cents
- measure capacity using non-standard units

Geometry

- connect dots to illustrate line segments and two-dimensional shapes

Background

Number: This unit begins with counting by twos to 50, from which a number of outcomes in both skills and concepts

emerge. In counting by twos from zero, the *even numbers* are named. In counting by twos from one, the *odd numbers* are named. Some children will note that combining the sets of even and odd numbers produces the set of all the whole numbers. They may also notice that in the two-place numerals, the pattern of the ones' digits is 0, 2, 4, 6, 8 for the even numbers, and 1, 3, 5, 7, 9 for the odd numbers. By drawing the children's attention to number patterns such as these, they are led to appreciate the structure of our numeration system.

Counting by twos from zero leads to a second major outcome by providing readiness for multiplication. One interpretation of multiplication relates it to repeated addition of the same addend. Since counting by twos can be shown as repeated addition of two, a foundation can be laid at this early stage for multiplication. By using sets of two objects, children can also learn to use the customary informal language of multiplication such as "4 twos are 8" and "6 twos are 12".

The sequence of whole numbers taken to 50 in the previous unit is now extended to 100. These are considered in terms of tens and ones, and the order of the numbers is reinforced by having children identify numbers one or two greater than (or less than) a given number.

Learning number concepts and acquiring skills in using them are important aspects of the curriculum, but the prime use of mathematics is found in solving problems in real life. Problem solving is a major goal and a central feature of a mathematics program. Skills for solving mathematical problems are acquired gradually as children apply their concepts and operational skills in real or life-like situations. In previous units, children had opportunities to write addition and subtraction sentences to represent joining and separating actions, and from this experience they discovered many basic facts. This might be classified as a "concrete level" of problem solving because it involves manipulation of real objects.

In this unit the children are taken to a slightly more advanced level of problem solving. Problem situations are pictured in illustrations, and children must be able to interpret an action shown as either a joining or a separating one. The ability to interpret these correctly is a crucial problem-solving skill; that is, to associate addition with joining and subtraction with separating or comparing. Later, when reading skills are significant and children are given word problems to solve, a mental picture of the situation being described will be used to help determine whether the action requires addition or subtraction.

Measurement: When the topic of capacity was introduced in Unit 5, the children worked with containers of different sizes and shapes and were asked to find which of two containers held more. Non-standard units for measuring capacity were suggested for use in *Related Activities* at that time. In this unit the children are required to measure and record the capacities of various containers in terms of selected non-standard units. The activity of filling several identical containers using one non-standard unit can provide an informal experience involving the ideas of ratio and rate. For example, if a jug can be filled by emptying the contents of a small jar four times into the jug, then the jug has four times the capacity of the jar and their capacities have a ratio of 4 to 1. From this scale, it is relatively easy to determine how many jars would be required to fill two, three, or more, identical jugs.

Geometry: Points in a plane can be represented by dots on paper. Through any two points, a straight line can be drawn and can be considered as extending without end in opposite directions (indicated by arrowheads). If just part of a line is considered with two end points, it is called a *line segment*. The concept emphasized in this unit is that the triangle, square, and other polygons consist of straight line segments. (Note that the term *triangle*, for example, defines just those points in the three line segments and does not include points in the inner and outer regions.)

Although the paths between two points are called curves, the path is *straight* if a ruler or straightedge is used to draw it. For page 197, the children are encouraged to use a straight edge (popsicle stick or Cuisenaire rod) to connect dots to illustrate line segments and two-dimensional shapes. For these shapes, the number of sides (line segments) and the number of corners (vertices) are determined.

Teaching Strategies

Previous progress in number concepts and skills will determine whether the children should be grouped for instruction in the number topics of this unit. These topics include counting by twos and fives and tens, addition and subtraction with sums and minuends to 10, place value in two-place numerals, and ordering numbers from 1 to 100. Counting money and selecting coins for amounts to 50 cents are dependent on previous experiences with money and to some extent on the ability to count by fives and tens. Other groupings may be used for the lessons in measurement and geometry because readiness for these topics does not involve number skills.

In connection with the lessons on money, the play store can add a sense of realism to many of the activities suggested. Since direct experience in the play store can involve only a few children at any one time, these activities should be spread over several days so that all may benefit.

The extension of the numeration system to one hundred leads to a wide variety of activities using a chart for the numbers from 1 to 100. The suggestions on pages T270 and T271 indicate how to use such a chart. Completed charts may be colored to show the numbers used in counting by twos, fives, and tens. Overlaying one counting pattern on another produces interesting designs by which children can discover where two or more counting systems intersect. Blank charts can be used to make individual practice sheets for ordering numbers if several key numerals are written on the charts to guide the children.

Remember that the children need time for play and experimentation before beginning any formal activities in measuring capacity. If a water table or a sand box is set up at the beginning of this unit, the children will be able to use the apparatus in their spare time. Using water or sand to measure capacity can present problems unless certain precautions are taken. Discuss procedures with the children and obtain their suggestions on how they should carry out the activities to ensure the greatest benefit and the least confusion. Because children have difficulty filling containers to the top, use a waterproof marker to make a mark just below the top of each container. If the children think of the container filled to this mark as "full", unnecessary spillage will be avoided. Plastic sheeting can be used to cover the floor and the working surfaces to minimize the risk of water damage. Since it is impossible for all the children to participate in this topic at the same time, it should

be spread over several days or weeks. Small activity cards or a chart in the activity centre can be used to indicate which containers to use. Prepared work sheets can simplify the recording of information.

Besides the lessons of this unit, regular review and practice of previous concepts and skills are required. Periodic testing should be employed to determine the individual strengths and weaknesses of the children. Practice materials such as flash cards, games, and work sheets should be available for the children to use in scheduled periods as well as in their free time. It is important that each child share in the desire to improve, and the keeping of an individual record of achievement offers good motivation.

Materials

number chart for 1 to 50, markers
 number lines for 0 to 50 and for 0 to 100
 display board and cutouts
 counters and crayons for each child
 cardboard, string, ruler
 ruler or a straightedge for each child
 flash cards for the words *circle*, *line segment*, *triangle*, *rectangle*, *square*, *sides*, *corners*
 flash cards for addition and subtraction facts having sums and minuends to 10
 number concept cards for 0 to 10 for each child
 objects for making sets, devices for set holders
 pictures of joining and separating situations
 cutouts of spacecraft and rockets (optional)
 sticks or straws and a container to hold them
 real money, play money, coin cutouts from copies of page T337
 small envelopes, items with tags showing prices to 50 cents
 objects suitable for grouping by tens
 pocket chart (See page xxxi.)
 copies of page T343 for each child
 containers of different sizes, baby-food jars to be used as non-standard units of capacity, water or sand, plastic sheeting
 ten counters such as transparent bingo chips
 overhead projector

Vocabulary

even numbers	straight
odd numbers	one hundred (optional)
line segment	fill
tight	full
loose	

Unit 10 Theme – In Space

The purpose of this theme is to make children aware of the vastness of outer space through the introduction of information that will help them to understand some of the mystery of the heavens.

Set up a display to create interest in outer space. Many pictures are available that can form the background for this display and arouse curiosity in the children. Display books about space and space travel. If possible, include a telescope. Provide plastic astronauts for the children to use at the sand table and in other role-playing situations. Also, provide astronaut props for role-playing and acting situations.

LANGUAGE ACTIVITIES

Provide some facts about the solar system by reading to the children from books about the planets, the stars, and outer space. Follow this with a discussion and then a related activity. It would be helpful to have a globe available for reference.

Some of the facts that you may wish to mention are given below. The depth of treatment will depend on the abilities and the interests of the children.

The Earth

- The earth is a ball of rock and metal called a *planet*.
- We believe that the earth is the only planet on which there are living things.
- The earth travels around the sun.
- The earth gets its heat and light from the sun.
- The earth rotates on its axis once every 24 hours. The part of the earth that is turned toward the sun has day; the part of the earth that is turned away from the sun has night.

Draw a large circle to represent the earth. Have the children suggest some of the living things that are found on the earth. Record these inside the circle.

The Sun

- The sun is the centre of the solar system with all the other planets revolving around it.
- The sun is “a million times” bigger than the earth.
- The sun is a huge ball of burning gases. (It is not solid like the earth nor liquid like water.)

Draw a big sun on a large sheet of paper. Have the children suggest some of the ways that we use the sun’s light and heat. Record these on the drawing of the sun.

Other Planets

There are nine planets that revolve around the sun, including Earth.

- Mercury – the planet closest to the sun
- Venus – the brightest planet
- Earth – the planet on which we live
- Mars – the planet that appears to be red
- Jupiter – the largest planet
- Saturn – the planet that has rings around it
- Uranus – the planet that has five moons
- Neptune – the planet that has two moons
- Pluto – the planet farthest from the sun

Have the children make the planets out of Plasticine and put a name on each one. They will need a reference book to help them with the sizes. Have the children place the planets in the order in which they appear in relation to the sun.

The Moon

- The moon gets its light from the sun.
- The moon revolves around the earth.
- The path that the moon takes around the earth is called an *orbit*.
- The moon takes 28 days to make its orbit around the earth.

Draw a moon on a sheet of paper. Have the children suggest as many words as they can think of to describe the moon. Record these on the drawing of the moon.

The Stars

- The sun is a star.
- All the points of light that twinkle in the sky are stars.
- Most stars are very large, but they look small because they are so far away.
- Some of the stars form patterns in the sky. They are called *constellations*.

There are many stories of how constellations were formed and how they got their names. Read several of these legends to the children.

1. A Moon Calendar

Prepare a large calendar for a particular month and record from day to day the children’s observations about the moon; for example, its shape, its size, its color, when it can be seen in the daytime.

2. A Moon Trip

Have the children plan a trip to the moon. Ask them to describe how it would be necessary to dress, and what supplies they should take with them. If they could take only one personal item with them, ask them what they would take.

3. I Loaded My Spaceship

This activity will provide an opportunity for the children to use new words related to space. Limit the number of players to six or eight children.

The first player says, “I loaded my spaceship and in it I put” The player completes the statement by using a word related to space or science. The second player must repeat the complete statement and include another word. The game continues with the complete statement being repeated and extended each time. If a player cannot name all the previous words, he / she must withdraw from the game.

MATHEMATICS ACTIVITIES

1. Classifying

Mark a piece of chart paper into two columns. Label one column “Things on Earth” and the other, “Things in Space”. Have the children suggest at least five things that would be appropriate for each column. Record these on the chart.

2. Symmetry

Select pictures of things related to space and space travel, for example, an astronaut, a rocket, a space capsule, a parachute, the moon, a crater, a meteorite, a star, a comet. Have the children select the pictures that show symmetry. Have the children draw one half of any one of the pictures and then check their drawings against the original pictures.

3. Drawing Two-Dimensional Shapes

Review with the children these basic shapes: circles, triangles, squares, rectangles, and line segments.

Have the children draw pictures of things related to space and space travel, using the basic shapes as the basis of each object in the picture.

4. How Many Days Until ... ?

This activity will enable the children to develop a better understanding of how long it will be before a special event, such as a birthday or a holiday, takes place.

Make a paper chain consisting of links of two alternating colors. Each link represents one day. For example, a paper chain of 15 links would mean 15 days until St. Valentine's Day.

As each day passes, tear off one link and subtract one from the number of links (days). Or, using the alternating colors, count by twos to determine how many links (days) remain.

The children may enjoy making a large spaceship and attaching paper chains of different colors to it for special occasions. Each chain will tell how many days until BLASTOFF for that particular event.

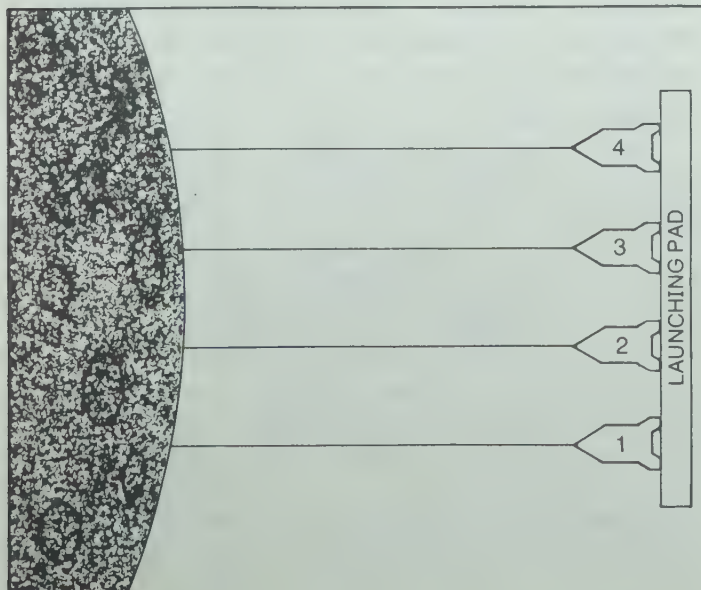
5. Star Trek

This activity will help to reinforce the children's ability to order a set of numbers. Any number of players can take part. Provide each player with a pencil and a sheet of paper. On the paper, ask each player to write, in any order, the numerals 10 to 20 for example, and then to draw a star around each numeral. Collect all the papers turned face down and distribute one to each player. When the word GO is given, each player turns the sheet over and draws line segments connecting the numerals in the correct order. The player who finishes first is the winner.

A variation of this activity could involve multiples of 2, 5, and 10.

6. Race to the Moon

Make a game board similar to the one shown below. The distance from the launching pad to the moon may be 50 cm, or less, depending on the ability of the children. You will need a rocket for each player, two dice, a piece of chalk, and a centimetre ruler.



Each flight begins with the tails of the rockets against the launching pad. The player with Rocket 1 tosses the dice and counts the dots on the dice. The player then measures from the tip of the rocket the number of centimetres indicated by the number of dots on the dice and marks the game board with the chalk. The rocket is then moved forward until its point is at the chalk mark. The game continues with the players taking turns in order. The player whose rocket reaches the moon first is the winner.

SCIENCE ACTIVITIES

1. Fascinating Facts

As you read to the children about the planets and the stars, they will think of questions that can be answered simply enough for them to understand. Encourage them to ask the questions as they think of them. For example,

“Why do stars twinkle?”

“Why can't you see the stars during the day?”

“What is the Milky Way?”

“Why do you speak of ‘the man in the moon’?”

2. Weightlessness

It is possible to enable the children to experience a feeling of weightlessness by taking them to the swings on a playground. As they swing, have them notice the light feeling that one gets at the highest point in the swing's path just before the swing begins to descend toward the ground. Similarly, have them notice the feeling of heaviness as the swing reaches the point closest to the ground.

Discuss the feelings experienced when riding on a bicycle or in a car over a large bump in the road, when riding on a roller coaster, when jumping off a diving board, or when riding down in a fast elevator.

3. Is Earth Round?

To demonstrate that Earth is round, have the children hold a small ball close to their eyes and observe its roundness. Then have them hold a large ball in front of their eyes. They should observe that it doesn't seem quite so round. Compare what has been observed about the balls with the large size of the earth, and point out that we are so close to the earth and it is so large that we are not aware of its roundness.

SOCIAL STUDIES ACTIVITIES

1. Learning About Space

Since the first landing on the moon was made on July 20, 1969, much additional information has been acquired about living and travelling in space. The following are some questions and words you may wish to discuss with the children.

Travelling in Outer Space

“What propels the rocket that lifts the spacecraft into orbit?”

“How is the direction of the spacecraft controlled?”

“What happens during a docking procedure?”

“What jobs are performed by the occupants of a spacecraft?”

“What safety precautions are taken during a splashdown?”

Space Travel Words

thrust, splashdown, rocket, jet, payload, orbit, lunar module, ignition, heat shield, gantry, flotation collar, countdown

Living in Outer Space

“Since there is no air in outer space how do the astronauts breathe?”

“What makes up the astronaut’s costume?”

“What special arrangements are made for eating in the spacecraft?”

“How do the astronauts communicate with the space centre?”

“How are the astronauts protected from illness before, during, and after a flight?”

Space Living Words

vacuum, isolation, oxygen, protein, energy

You may wish to have the children make a “Space Dictionary” of the new words that they have learned. Many of these words can be illustrated with pictures and drawings.

2. Space Clothes

Astronauts must wear special suits to protect them from the hazards of space. The space suits have a layer of material that reflects heat. The space suits are also insulated to provide protection from extremes in temperature.

To demonstrate these features of a space suit you will need a brown paper bag, a metallic bag used for carrying ice cream or hot chicken, two thermometers, six ice cubes, and some string.

Place three ice cubes and a thermometer in each bag. Tie the top of each bag tightly with string. At the end of five or ten minutes, have the children read the temperature in each bag. They will be able to observe that it is cooler inside the metallic bag because the shiny surface reflects heat, whereas the thin brown paper permits heat to enter that bag.

Discuss with the children the differences in clothing in different parts of the world. Have them draw conclusions about how the sun affects the choice of clothing.

ART ACTIVITIES

1. Hot Colors

Ask the children what colors the heat of the sun suggests to them. They should suggest red, orange, and yellow.

Using a sponge and thinned tempera paint, have each child paint on a large sheet of paper with the three colors. About one-third of the sheet should be red, one-third orange, and one-third yellow.

Have the children cut rockets, planets, and other space items from black paper to arrange on this “hot” background.

2. Rocket Display

Have the children collect cardboard tubes of different sizes from rolls of paper towels, waxed paper, and so on. When there are enough for the whole class, begin to construct rockets. Construction paper of different colors can be used for the nose cones and the fins. Lunar or command modules can be made from pieces of cardboard or small boxes. Encourage the children to use many different techniques for decorating their rockets so that they will make an interesting and colorful display in the classroom.

MOVEMENT ACTIVITIES

1. Being a Planet

Show the children how planets rotate and revolve, and discuss the fact that the effect of gravity in space is so small that

things become weightless. Have the children move around the room, using floating and turning movements.

Play a familiar game, such as tag, as though the players were on the moon. Have the children walk and run as though their bodies were very light.

2. Rockets Away

Have the children simulate the liftoff motion of a rocket and then the steady climb of the rocket until it settles into orbit. Have the children create these movements in sequence.

3. Moon Chase

Choose a boundary in the gym to define the playing area for this game. One player is chosen to be a MOON and stands in the centre of the playing area. The other players stand on the boundary of the playing area and call, “MOON, MOON, may we chase you soon?” MOON replies by stating the conditions that will enable some or all of the players to participate. For example, MOON might say, “Yes, yes, if you have a shirt of red.” All players wearing a red shirt, red blouse, or red sweater chase MOON within the playing area. Those who chase MOON must move with light floating movements as though they were on the moon. The player who tags MOON first becomes the next MOON, who chooses another condition. Any player who “floats” outside the playing area must withdraw from the game.

4. Spacecraft Attack

Have all the players but one, Spaceman, form a large circle. Place a paper plate or a shallow pan in the centre of a circular region. Give each player in the circle a small beanbag. Ask Spaceman to stand beside the “spacecraft” to defend it. On a signal the players throw the beanbags at the spacecraft, trying to hit it. Spaceman tries to keep the beanbags from hitting the spacecraft. In doing so, Spaceman moves about and strikes the beanbags away. The players may go inside the circular region to recover beanbags, but all throws must be made from the boundary. When a beanbag hits the spacecraft, the successful thrower becomes Spaceman and the game continues.

MUSIC ACTIVITIES

1. Listening

Select a piece of music that suggests a space theme, for example, the music from “2001 Space Odyssey”. Have the children interpret the music in terms of the information that has been acquired.

2. Space Songs

Collect and record rhymes, poems, and songs that make reference to some aspect of space. Use the following titles to begin a list.

“Hey, Diddle, Diddle”

“Star Light, Star Bright”

“When You Wish upon a Star”

“Twinkle, Twinkle, Little Star”

Unit 10

Jump by twos.



What number is 2 greater than each?

6 8 11 13 17 19 21 23
 26 28 28 30 32 34 33 35
 37 39 40 42 47 49 48 50

Complete.

2 4 6 8 10 12 14 16 18 20
 1 3 5 7 9 11 13 15 17 19
 20 22 24 26 28 30 32 34 36
 31 33 35 37 39 41 43 45 47

Counting by twos

(one hundred ninety-five) 195

LESSON OUTCOME

Count by twos to 50

Materials

number chart for the numbers from 1 to 50, markers, number line, crayons for each child

Vocabulary

even numbers, odd numbers

RELATED ACTIVITIES

- You may wish to use the page for one or more of the following activities: Have the children count by twos using the odd numbers and mark these on the number line by using X's or ringing the numerals. Have the children count by twos using the odd numbers in the chart and color the square shapes. Have the children start at 5 on the chart and count by fives to 50, ringing the numerals as they proceed.
- Have the children count objects in the classroom that they can see in twos, for example, rubber boots, gym shoes, mittens, hands, feet, eyes, ears.
- Have the children count in unison without reference to a chart or a number line. Have them count as follows: "One (silently), two (aloud), three (silently), four (aloud)", and so on.
- Have the children practise counting by twos several times during the day. You may wish to play the game "Car Rally" described on page T277 to reinforce counting by twos.

LESSON ACTIVITY

Before Using the Page

- Ask the children to stand in line and count by ones to 50, one number for each child. Ask the children to count to 50 again, but as each child says an even number have her/him step forward. When all the children for the even numbers have moved forward, have them count by twos, saying, "Two, four, six, . . . , fifty." Tell the children that these numbers are called *even numbers*. Ask the children in the row behind also to count by twos, saying, "One, three, five, . . . , forty-nine." Tell the children that these numbers are called *odd numbers*.
- Display a large chart showing the numbers from 1 to 50. Have children, in turn, place markers for counting by twos from a given even number; for example, start at 16 and stop at 28. Repeat several times. Then have the children count by twos from a given odd number; for example, start at 11 and stop at 29. Repeat several times.
- On a number line labelled from 0 to 50 on the chalkboard, start at 0 and count two units to the 2. Draw a curved arrow

from the 0 to the 2 to show the jump. Have children, in turn, draw arrows to show the jumps. As each child draws an arrow, have her/him repeat the counting from the beginning. For example, if she/he draws the arrow from the 10 to the 12, the child should then say, "Two, four, six, eight, ten, twelve." Repeat the procedure for each jump.

Using the Page

- Read the instruction at the top of the page to the children. Discuss how they are to count by twos on the number line and draw curved arrows as shown to indicate the even numbers in sequence. Have the children draw the arrows and count silently as they do so.
- Have a child read the word "Color" above the chart. Lead the children to observe that all the squares for the even numbers are to be colored yellow.
- For the last part of the page, have the children record the number that is two greater than each of the numbers given.

After the children have completed the page, have them mark an X beside each set that is a sequence of even numbers and mark a \checkmark beside each set that is a sequence of odd numbers.

LESSON OUTCOME

Determine the number of objects in one or more groups of two, to 9 twos

Materials

display board and cutouts, counters for each child

RELATED ACTIVITIES

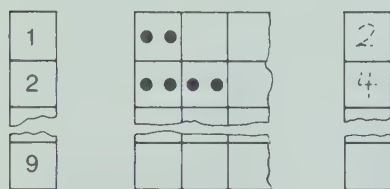
• Prepare a work sheet having a grid of nine squares by nine squares for each child. Have the children draw two colored dots in each square to illustrate from one set of two to nine sets of two. Have them show the number of dots in all in the column at the right.

When the charts have been completed, you may wish to ask questions of the following types:

“How many dots are there in five sets of two?”

“If there are 14 dots, how many sets of two are there?”

Sets

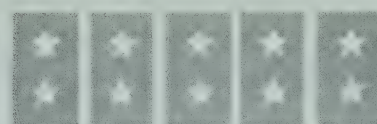


Complete.



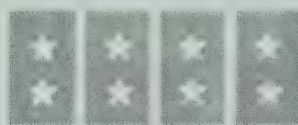
$$2 + 2 = 4$$

2 sets of 2 are 4



$$2 + 2 + 2 + 2 + 2 = 10$$

5 sets of 2 are 10



$$2 + 2 + 2 + 2 = 8$$

4 sets of 2 are 8



$$2 + 2 + 2 + 2 + 2 + 2 = 12$$

6 sets of 2 are 12



$$2 + 2 + 2 = 6$$

3 sets of 2 are 6



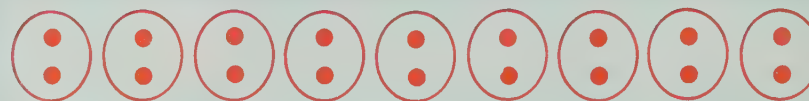
$$2 + 2 + 2 + 2 + 2 + 2 + 2 = 14$$

7 sets of 2 are 14



$$2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 16$$

8 sets of 2 are 16



$$2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 18$$

9 sets of 2 are 18

196 (one hundred ninety-six)

Repeated addition using sets of two

LESSON ACTIVITY

Before Using the Page

• Review counting by twos using some of the activities suggested in *Before Using the Page* on page T255.

• Ask three children to stand in front of the other children. Ask how many children there are, how many eyes each child has, and how many eyes there are. Say, “There are three sets of two eyes. How many eyes are there?” Have the children say, “Three sets of two are six.” Ask another child to join the group. Repeat the questions and end with the statement, “Four sets of two are eight.” Continue for a group of five children and a group of six children.

• Place six cutouts in sets of two on the display board. Ask how many there are in each set and how many there are in all. Ask what addition sentence will tell how many there are ($2 + 2 + 2 = 6$). Write the sentence on the chalkboard. Ask how many sets there are (3). Write “3 sets of 2 are _____” on the chalkboard. Have a child complete the statement. Have children display two sets of two and five sets of two. Repeat

the sequence of questions. Remind the children that working with sets of two is faster than counting singly.

Using the Page

• Discuss the first exercise with the children. Ask how many stars there are in the first set and how many stars there are in the second set. Ask how many stars there are in the two sets together. Ask how many stars there are in two sets of two. Have the children write the answer. Then let the children work independently. For the last two exercises you may wish to have the children make eight sets of two counters and nine sets of two counters before they draw the sets.

LESSON OUTCOME

Connect dots to illustrate line segments and two-dimensional shapes

Materials

cardboard, string, ruler, a piece of paper and a ruler or a straightedge for each child, flash cards for the words *circle*, *line segment*, *triangle*, *rectangle*, *square*, *sides*, *corners*

Vocabulary

line segment, tight, loose, straight

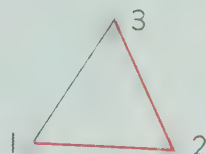
RELATED ACTIVITIES

- Prepare a work sheet of a simple dot-to-dot picture for the children to complete. Label the points 0, 2, 4, 6, and so on to reinforce counting by twos and the order of the numbers. Have the children use a straightedge to join the dots.
- Have the children draw pictures or patterns by using straightedges for joining dots on copies of page T333 or T334.

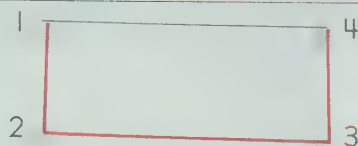
Join the dots. Ring the correct name.



circle line segment



triangle rectangle square



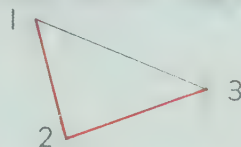
triangle rectangle square



triangle rectangle square



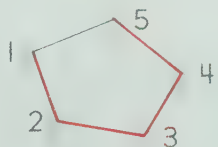
4 sides 4 corners



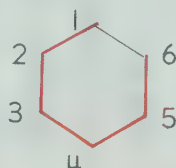
3 sides 3 corners



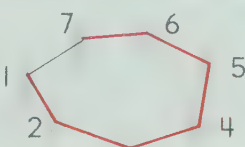
4 sides 4 corners



5 sides 5 corners



6 sides 6 corners



7 sides 7 corners

Complete the shapes by joining the dots in order. Show the number of sides and the number of corners.

Drawing two-dimensional shapes

(one hundred ninety-seven) 197

LESSON ACTIVITY

Before Using the Page

• Until now the children have been joining dots freehand. In this lesson the idea of a *line segment* is introduced. Punch four holes in a piece of cardboard. Make a knot in one end of a piece of string. Pull the string up through one hole and pull it tightly down through a second hole. Thread a second piece of string loosely through the other two holes. Have the children compare the two pieces of string by saying that one is tight and one is loose. Lead them to use the word *straight* for the tight string.



• Draw two large dots on the chalkboard. Use a ruler to draw a line segment joining the two dots. Tell the children that you have drawn a *line segment*. Have the children draw several pairs of dots on a piece of paper and join them by using a straight edge such as a Cuisenaire rod, a popsicle stick, or a strip of cardboard.

• Draw three large dots on the chalkboard. Use a ruler to join the dots in pairs. Ask how many line segments you drew and what shape you made. Print the word "triangle" below the shape. Repeat for a square and a rectangle.

Review the words *sides* and *corners* and their meanings. Below each shape, print "____ sides ____ corners" and have children print the appropriate numerals.

• Use flash cards showing the words *circle*, *line segment*, *triangle*, *rectangle*, *square*, *sides*, and *corners* to determine how well the children will be able to read the words.

Using the Page

• Read the words for the first part of the page with the children. Discuss how the dots are to be joined according to the order of the numbers. When the dots are joined correctly, familiar shapes will appear. Have the children ring the correct name for each shape.

• Have the children use a ruler or a straightedge to draw the sides of each shape for the second part of the page. When the shapes have been completed, have the children record the number of sides and the number of corners for each.

OBJECTIVE

Complete basic addition and subtraction facts, sums and minuends to 10

Materials

flash cards for addition and subtraction facts having sums and minuends to 10, number concept cards for 0 to 10 for each child, objects for making sets

RELATED ACTIVITIES

- Have children discover all the number combinations that have a difference of, say, 5 and record the corresponding subtraction sentences ($10 - 5 = 5$, $9 - 4 = 5$, $8 - 3 = 5$, $7 - 2 = 5$, $6 - 1 = 5$, $5 - 0 = 5$). You may wish to have them record their results in a chart similar to the one shown below.

0	1	2
$10 - 10$	$10 - 9$	$10 - 8$
$9 - 9$	$9 - 8$	$9 - 7$
$8 - 8$	$8 - 7$	
$7 - 7$		

$2 + 3 = 5$
 $6 = 4 + 2$

Complete.

$5 + 2 = \underline{7}$	$\underline{9} = 7 + 2$
$3 + 4 = \underline{7}$	$\underline{8} = 2 + 6$
$8 + 2 = \underline{10}$	$\underline{8} = 4 + 4$
$7 + 1 = \underline{8}$	$\underline{7} = 6 + 1$
$3 + 3 = \underline{6}$	$\underline{7} = 7 + 0$
$7 + 3 = \underline{10}$	$\underline{3} = 1 + 2$
$5 + 0 = \underline{5}$	$\underline{10} = 4 + 6$
$6 - 5 = \underline{1}$	$\underline{6} = 9 - 3$
$7 - 7 = \underline{0}$	$\underline{8} = 10 - 2$
$4 - 1 = \underline{3}$	$\underline{1} = 5 - 4$
$5 - 3 = \underline{2}$	$\underline{3} = 8 - 5$
$8 - 4 = \underline{4}$	$\underline{6} = 7 - 1$
$3 - 0 = \underline{3}$	$\underline{0} = 9 - 9$
$9 - 4 = \underline{5}$	$\underline{5} = 10 - 5$

Add.

$\begin{array}{r} 3 \\ + 1 \\ \hline 4 \end{array}$	$\begin{array}{r} 2 \\ + 8 \\ \hline 10 \end{array}$
$\begin{array}{r} 4 \\ + 5 \\ \hline 9 \end{array}$	$\begin{array}{r} 3 \\ + 6 \\ \hline 9 \end{array}$
$\begin{array}{r} 7 \\ + 2 \\ \hline 9 \end{array}$	$\begin{array}{r} 5 \\ + 3 \\ \hline 8 \end{array}$

Subtract.

$\begin{array}{r} 6 \\ - 2 \\ \hline 4 \end{array}$	$\begin{array}{r} 7 \\ - 4 \\ \hline 3 \end{array}$
$\begin{array}{r} 10 \\ - 4 \\ \hline 6 \end{array}$	$\begin{array}{r} 9 \\ - 2 \\ \hline 7 \end{array}$
$\begin{array}{r} 8 \\ - 6 \\ \hline 2 \end{array}$	$\begin{array}{r} 10 \\ - 6 \\ \hline 4 \end{array}$

198 (one hundred ninety-eight)
Addition and subtraction practice, sums and minuends to 10

LESSON ACTIVITY

Before Using the Page

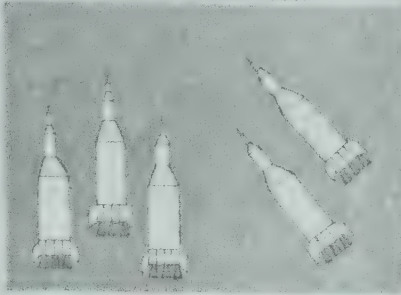
- Use flash cards to review addition and subtraction facts having sums and minuends to 10. When you display a flash card, have each child hold up the appropriate number concept card so that the side with the numeral is visible for checking.
- Display a set of five objects. Have children, in turn, state the number combinations that are possible for a sum of five; that is, 5 and 0, 4 and 1, 3 and 2, 1 and 4, and 0 and 5. Have other children write the corresponding addition sentences on the chalkboard in the form $5 = 5 + 0$, $5 = 4 + 1$, $5 = 3 + 2$, and so on. Discuss the fact that the form $5 = 3 + 2$ says the same thing as $3 + 2 = 5$. Children should be aware that the "answer" need not always appear at the right of a number sentence. Repeat for sets of six, seven, eight, and nine.
- Display a set of eight objects. Have a child take away three of them and state the subtraction sentence that describes the action. Have another child write the sentence ($8 - 3 = 5$) on the chalkboard. Write $\underline{\quad} = 8 - 3$ below the first subtraction sentence.

tion sentence. Ask what number is needed to complete the number sentence. Write the 5 and have a child read each sentence to emphasize that the two sentences say the same thing. Repeat with other examples.

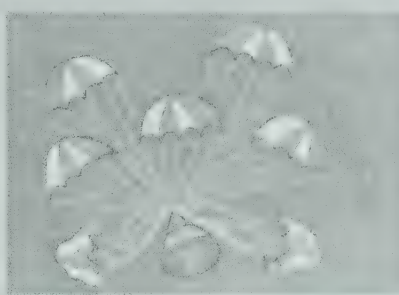
Using the Page

- Discuss with the children the two addition sentences at the top of the page. Have the children observe that for the two columns of addition and subtraction sentences, the answers are to be written to the right of the symbol $=$ in the first column and to the left of the symbol $=$ in the second column.
- For the exercises in the rocket, you may wish to test the children to see how quickly they can complete them.
- After the children have completed the page, have them find the exercise in the rocket that gives the answer for a problem.
 - There were four astronauts in space. They were joined by five astronauts. How many astronauts were there in all?
 - There were seven rockets on launching pads. Four rockets were fired. How many rockets have not been fired?

Write the number sentences.



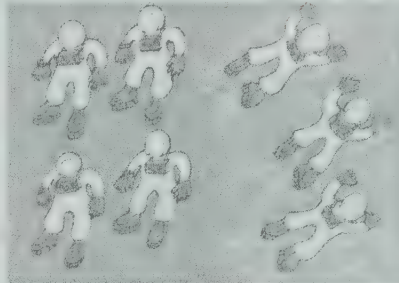
$$3 + 2 = 5$$



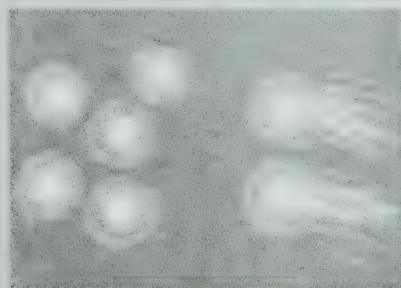
$$7 - 2 = 5$$



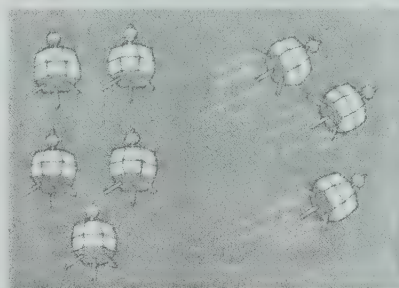
$$6 + 3 = 9$$



$$7 - 3 = 4$$



$$5 + 2 = 7$$



$$8 - 3 = 5$$

Writing addition and subtraction sentences

(one hundred ninety-nine) 199

LESSON OUTCOME

Write a number sentence to describe an additive or subtractive situation

Materials

pictures and objects for joining and separating situations, cutouts of spacecraft and rockets (optional)

RELATED ACTIVITIES

- Ask children in turn to tell stories about joining and separating actions. As each story is told, have other children write the number sentence that describes the action. Ask one child to write the number sentence on the chalkboard so that the others can check their answers.
- Catalogues showing children's clothing offer many possibilities for making picture cards that suggest the joining or separating of sets. Prepare a supply of such cards and have the children write number sentences that describe the situations. You may wish to provide the number sentences so that the children can match each picture with the appropriate number sentence.

LESSON ACTIVITY

Before Using the Page

- Display a picture that shows either a joining or a separating situation. Have the children discuss what is happening in the picture. By asking questions have the children decide what number sentence will describe the situation. Have a child write the number sentence on the chalkboard. Repeat for other pictures that show joining and separating situations.
- Have several children use pictures or objects and tell stories about them. You may wish to prepare cutouts similar to those shown on the page for the children to manipulate and make up stories for other children to solve. For example, the children may enjoy making up stories about spacecraft and astronauts. Have the children discuss what number sentence will describe each situation, and have one child write it on the chalkboard.

The preceding activity encourages children to be imaginative and creative. Some children may prefer to dramatize situations rather than use pictures or objects. Modify the activity for the children's preference. The more pleasant the experiences

the children have with an activity like this one, the more positive will be their approach to problem solving at a later stage.

Using the Page

- Read and discuss the instruction at the top of the page with the children. Ask them to make up a story that describes what is happening in the first picture. Establish whether the picture illustrates an additive or subtractive situation. After several children tell their stories, discuss what number sentence can be used to describe what is happening. Have the children write the number sentence below the picture.

Discuss the other pictures with the children and then have them write the appropriate number sentences.

LESSON OUTCOME

Complete related basic addition and subtraction facts, sums of 9

Materials

display board and cutouts

RELATED ACTIVITIES

- Have the children make a page showing the related facts having sums of 9 for their "Book of Facts".

$0 + 9 = 9$	$9 - 9 = 0$
$1 + 8 = 9$	$9 - 8 = 1$
$2 + 7 = 9$	$9 - 7 = 2$
$3 + 6 = 9$	$9 - 6 = 3$
$4 + 5 = 9$	$9 - 5 = 4$
$5 + 4 = 9$	$9 - 4 = 5$
$6 + 3 = 9$	$9 - 3 = 6$
$7 + 2 = 9$	$9 - 2 = 7$
$8 + 1 = 9$	$9 - 1 = 8$
$9 + 0 = 9$	$9 - 0 = 9$

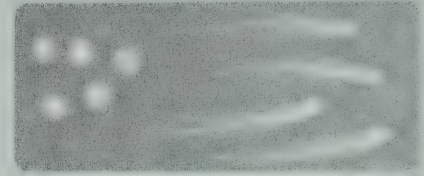
- Challenge children to see how many different addition sentences they can write using three different numbers having a sum of 9. The following addition sentences are possible:

$8 + 1 + 0 = 9$
 $7 + 2 + 0 = 9$
 $6 + 3 + 0 = 9$
 $6 + 2 + 1 = 9$
 $5 + 4 + 0 = 9$
 $5 + 3 + 1 = 9$

Complete.



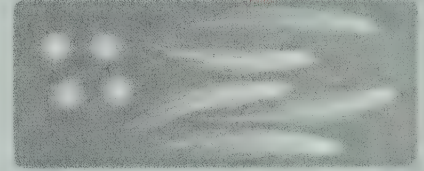
$$3 + 6 = 9$$



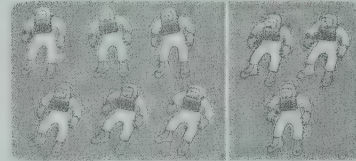
$$9 - 3 = 6$$



$$4 + 5 = 9$$



$$9 - 4 = 5$$

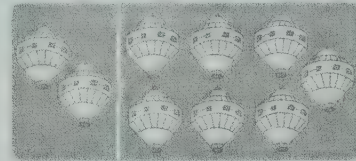


$$6 + 3 = 9$$

$$9 - 3 = 6$$

$$3 + 6 = 9$$

$$9 - 6 = 3$$

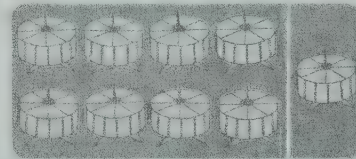


$$2 + 7 = 9$$

$$9 - 7 = 2$$

$$7 + 2 = 9$$

$$9 - 2 = 7$$

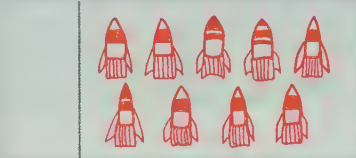


$$8 + 1 = 9$$

$$9 - 1 = 8$$

$$1 + 8 = 9$$

$$9 - 8 = 1$$



$$0 + 9 = 9$$

$$9 - 9 = 0$$

$$9 + 0 = 9$$

$$9 - 0 = 9$$

200 (two hundred)

Relating addition and subtraction facts, sums of 9

LESSON ACTIVITY

Before Using the Page

- Place four cutouts on the display board. Ask how many there are. Have a child place cutouts beside the others to make a set of nine and state the addition sentence ($4 + 5 = 9$). Ask a child to write the addition sentence on the chalkboard. Place five cutouts on the display board. Ask how many there are. Have a child place cutouts beside the others to make a set of nine and state the addition sentence ($5 + 4 = 9$). Write it below the first sentence on the chalkboard. Opposite $4 + 5 = 9$ write " $9 - 5 = \underline{\quad}$ ". Have a child manipulate the cutouts to illustrate the subtraction situation and complete the subtraction sentence. Repeat the procedure for $9 - 4 = \underline{\quad}$.

Place three cutouts on the display board and then six more cutouts. Ask how many there are. Have a child state the addition sentence that describes the situation. Have a child write the addition sentence ($3 + 6 = 9$) on the chalkboard. Ask one child to state the related addition sentence without manipu-

lating the cutouts and another child to write the addition sentence ($6 + 3 = 9$) on the chalkboard. Have a child move six of the cutouts away and state the subtraction sentence that describes the situation. Have a child write the subtraction sentence ($9 - 6 = 3$) on the chalkboard. Have another child state and write the related subtraction sentence ($9 - 3 = 6$) on the chalkboard.

Continue for other combinations of nine cutouts, but encourage the children to develop the ability to write the related addition and subtraction facts without needing to manipulate the cutouts.

Using the Page

- Discuss the four related pictures at the top of the page to determine whether the children can interpret the additive and subtractive situations correctly. Have the children complete the four related facts. Then let the children work independently. For the last exercise have the children draw nine objects separated into a group of zero objects and a group of nine objects before they complete the four number sentences.

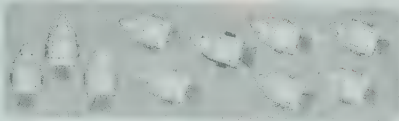
Complete.



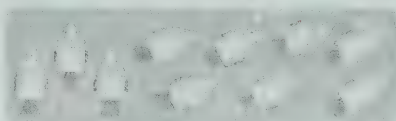
$$7 + 3 = 10$$



$$10 - 3 = 7$$



$$3 + 7 = 10$$

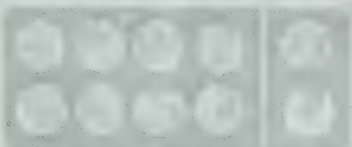


$$10 - 7 = 3$$



$$5 + 5 = 10$$

$$10 - 5 = 5$$



$$8 + 2 = 10$$

$$10 - 2 = 8$$

$$2 + 8 = 10$$

$$10 - 8 = 2$$



$$10 + 0 = 10$$

$$10 - 0 = 10$$

$$0 + 10 = 10$$

$$10 - 10 = 0$$

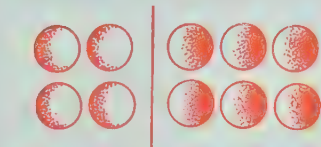


$$9 + 1 = 10$$

$$10 - 1 = 9$$

$$1 + 9 = 10$$

$$10 - 9 = 1$$



$$4 + 6 = 10$$

$$10 - 6 = 4$$

$$6 + 4 = 10$$

$$10 - 4 = 6$$

Relating addition and subtraction facts, sums of 10

(two hundred one) 201

LESSON OUTCOME

Complete related basic addition and subtraction facts, sums of 10

Materials

sticks or straws and a container to hold them, ten counters for each child

RELATED ACTIVITIES

- Give each child a sheet of paper for recording number sentences. State two numbers having a sum of 10 or less and have the children write an addition sentence. Then have them write the other related sentences. When the children have finished each set, write the number sentences on the chalkboard so that they can check their own work.
- Have the children make a page showing the related facts having sums of 10 for their "Book of Facts".

$0 + 10 = 10$	$10 - 10 = 0$
$1 + 9 = 10$	$10 - 9 = 1$
$2 + 8 = 10$	$10 - 8 = 2$
$3 + 7 = 10$	$10 - 7 = 3$
$4 + 6 = 10$	$10 - 6 = 4$
$5 + 5 = 10$	$10 - 5 = 5$
$6 + 4 = 10$	$10 - 4 = 6$
$7 + 3 = 10$	$10 - 3 = 7$
$8 + 2 = 10$	$10 - 2 = 8$
$9 + 1 = 10$	$10 - 1 = 9$
$10 + 0 = 10$	$10 - 0 = 10$

LESSON ACTIVITY

Before Using the Page

- Place ten sticks or straws in a pile. Have a child pick up some of the sticks (3), state how many there are, and place them in a container. Have a second child pick up the remaining sticks, state how many there are (7), and place them in the container. Ask a child to write the addition sentence ($3 + 7 = 10$) on the chalkboard. Have a child remove the seven sticks and state the subtraction sentence ($10 - 7 = 3$) that describes the situation. Ask other children to write the other related number sentences. Repeat the activity by putting the sticks in a pile again and having children choose some of the sticks, describe each situation, and write the corresponding number sentence.

After you have repeated the activity several times, if no child has picked up the ten sticks at once, do so and put them in the container. Ask what number sentence describes your action ($10 + 0 = 10$). Discuss the other related facts with the children.

- Write a number sentence on the chalkboard, for example, $2 + 8 = \underline{\quad}$. Have children complete it and then state the other related addition and subtraction sentences. Have children write the sentences on the chalkboard. You may wish to review related facts having sums of 6, 7, 8, and 9.
- Play the game "I Am Ten. Who Are You?" with the children. Ask a child to state a number less than ten. Have the other children use their counters to find what number added to the number chosen gives a sum of 10. The child who first gives the correct addition sentence may choose the number for the next round.

Using the Page

- Discuss the four related pictures at the top of the page to determine whether the children can interpret the additive and subtractive situations correctly. Have the children complete the four related facts. Then let the children work independently. For each of the last two exercises have the children draw ten objects separated into groups of 9 and 1, and 4 and 6 before they complete the number sentences.

LESSON OUTCOME

Determine the values of sets of dimes, nickels, and pennies for amounts to 50 cents

Materials

real money, play money, or coin cutouts from copies of page T337

RELATED ACTIVITIES

- Use coin cutouts from copies of page T337 to prepare a work sheet showing sets of coins. Have the children record the value of each set (not greater than 50 cents).
- To challenge some children, display sets of coins consisting of dimes and nickels interspersed, for example, dime, nickel, dime, dime, nickel. For this set, have them count, "10, 15, 25, 35, 40." Have the children rearrange the coins in order of value and count again to check that the set of coins has the same value as before.

How much ?

202 (two hundred two) Working with amounts to 50 cents

LESSON ACTIVITY

Before Using the Page

- Review the names of the coins (penny, nickel, dime) and their values. Display two dimes. Have a child count by tens to determine the value of the two coins. Repeat for three, four, and five dimes.
- Display two dimes and four pennies. Have a child count by tens and then by ones to determine the value of the set of coins. Repeat for other sets of dimes and pennies having values to 50 cents.
- Display five nickels. Have a child count by fives to determine the value of the set of coins. Repeat for other sets of nickels having values to 50 cents.
- Display four nickels and three pennies. Have a child count by fives and then by ones to determine the value of the set of coins. Repeat for other sets of nickels and pennies having values to 50 cents.
- Display a set of three dimes and four nickels. Have a child count by tens and then by fives to determine the value of the set

of coins. Include two pennies and ask for the value of the set of coins. Repeat for other combinations of dimes, nickels, and pennies having values to 50 cents.

Using the Page

- Direct the children's attention to the words at the top of the page and elicit from the children that they are to find the value of the coins in each set and to record the amount. After the children have recorded all the values, have them use a / to indicate the three sets of coins that have the same value (50 cents).
- Have the children refer to the sets of coins for solving problems similar to the following:
 1. Which set has the fewest coins? How many coins are there? What one coin could replace the three coins?
 2. What is the value of the fourth set of coins? How many coins are there? What two coins could replace the six coins?
 3. Find the set worth 40¢. How many coins are there? How could you show the same value with half as many coins?
 You may choose to increase the difficulty of the questions according to the abilities of the children.

LESSON OUTCOME

Determine the values of sets of quarters, dimes, nickels, and pennies for amounts to 50 cents

Materials

real money, play money, or coin cutouts from copies of page T337

RELATED ACTIVITIES

- On separate sheets of paper, have the children draw other sets of coins that have the same value as those given on the page. For example, for 25 cents, one can show two dimes and a nickel, or one dime and three nickels.
- Play a game that can be called "Money Bingo". You will need game boards showing nine sets of coins each having a value to 50 cents. Prepare a set of "call" cards, each card also showing a set of coins having a value to 50 cents. If five children play, four have game boards and the fifth is the leader. The leader holds up a "call" card for the other players to see and counts, for example, "25, 30, 31, 32." The player whose game board shows a set of coins having that value claims the card and uses it to cover the set of coins. The player whose game board is covered first is the winner.

How much?

Use a ... to show the sets of coins having the same value.

Working with amounts to 50 cents

(two hundred three) 203

LESSON ACTIVITY**Before Using the Page**

- Review the names of the coins (penny, nickel, dime, quarter) and their values. Display a quarter. Ask a child to show a set of coins having a value of 25 cents (two dimes and a nickel). Ask another child to show another set of coins having the same value (one dime and three nickels). Ask a child to show a set of nickels having a value of 25 cents (five nickels). Ask another child to suggest how many pennies would be needed to have a value of 25 cents.
- Display a quarter, two dimes, and a nickel. Have a child find the value of the set of coins (50 cents). Ask what coin could replace the two dimes and the nickel (a quarter). Replace the dimes and the nickel with a quarter. Ask what is the value of two quarters (50 cents).
- Display four dimes and two nickels. Have a child find the value of the set of coins (50 cents). Ask a child to replace the dimes and the nickels with quarters. Again ask the value of two quarters.

- Display the following sets of coins and have children count to determine the value of each.

1. one quarter, three pennies (28 cents)
 2. one quarter, three nickels (40 cents)
 3. one quarter, two dimes (45 cents)
 4. one quarter, one nickel, two pennies (32 cents)
 5. one quarter, two dimes, three pennies (48 cents)
- Continue with other examples if time is available.

Using the Page

- Discuss with the children that they are to work on this page in the same way as they did for page 202. After the children have recorded all the values, have them use a ✓ to indicate the two sets of coins that have the same value (50 cents).
- Have the children refer to the sets of coins for solving problems similar to the following:
 1. Find the set of coins having a value of 42 cents. How many more pennies are needed for the value of the set of coins to be 45 cents?
 2. How could you show the value of the last set of coins with fewer coins?

LESSON OUTCOME

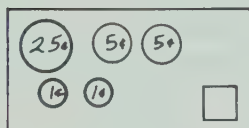
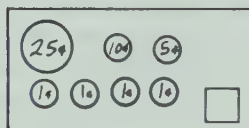
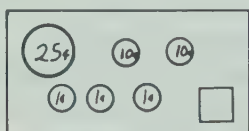
Select the coins required for amounts to 50 cents

Materials

real money, play money, or coin cutouts from copies of page T337, small envelopes, items with tags showing prices to 50 cents

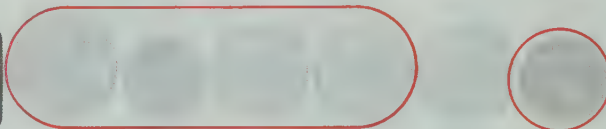
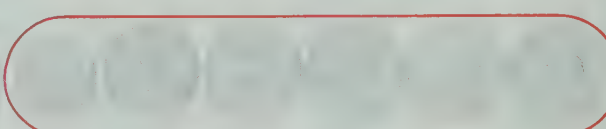
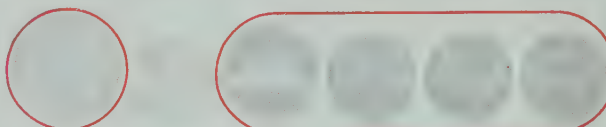
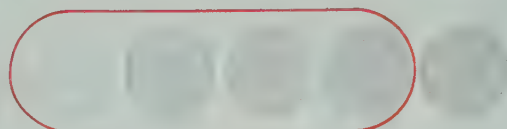
RELATED ACTIVITIES

- Use coin cutouts from copies of page T337 to prepare cards showing pictures of coins.



Have the children count to determine the value of each set of coins and either record the amount on the card or place on the card a numeral card showing the amount.

Ring the coins you need.



Ring the coins needed to buy each rock.

204 (two hundred four)

Choosing coins for amounts to 50 cents

LESSON ACTIVITY

Before Using the Page

- Display sets of coins containing various combinations of quarters, dimes, nickels, and pennies (values to 50 cents). Have children count to determine the value of each set.
- Display a set of coins at random (values to 50 cents). Have a child place the coins in order of value from greatest to least and count to determine the value of the set of coins. Repeat with other sets of coins.
- Place different amounts of money in small envelopes. Have each child choose an envelope and count the money in the envelope. Display a number of items with tags showing prices to 50 cents. Call on children in turn to name an object that they have enough money to pay for. Have the children choose the coins needed and count to show that their choice is correct. Remind the children to start counting with the coin of greatest value first. You may wish to extend this activity by asking the children the value of the coins that they did not use to pay for the item.

Using the Page

- Read the words at the top of the page with the children. Lead them to understand that they are to ring the coins needed to buy each rock. Ask which coins have a value of 8 cents. Have the children ring the coins and then continue on their own.
- After the children have completed the page, you may wish to have them record the value of each set of coins not needed to buy the rock. You may also wish to present problems similar to the following:
 1. How much money was not needed in the first set of coins? In which other set of coins was the same amount of money not needed? (the last set)
 2. In which set were all the coins used? (the fifth set)
 3. How much more money was left from the first set of coins than from the second set? (5 cents)

LESSON OUTCOME

Show the coins required for amounts to 50 cents

Materials

real money, play money, or coin cutouts from copies of page T337, items with tags showing prices to 50 cents

RELATED ACTIVITIES

- After the children have completed the page, you may wish to have them suggest all the possible sets of coins for the values 12 ¢, 27 ¢, 19 ¢, and 39 ¢.
- Mark items with prices to 50 cents for the play store. Have children give the exact number of coins to the storekeeper to pay for each item.
- From catalogues, have the children cut pictures of items they might buy, and paste them on sheets of paper or cardboard. Print a price beside each item and cover the sheets with acetate. Have the children draw pictures of the coins needed to buy each item.

Draw the coins you need.

Answers may vary.

Show the coins needed to buy each rock.

15¢	10¢	5¢					
12¢	10¢	1¢	1¢				
27¢	25¢	1¢	1¢				
19¢	10¢	5¢	1¢	1¢	1¢	1¢	
39¢	25¢	10¢	1¢	1¢	1¢	1¢	
46¢	25¢	10¢	10¢	1¢			
49¢	25¢	10¢	10¢	1¢	1¢	1¢	1¢
50¢	25¢	25¢					

Showing coins for amounts to 50 cents

(two hundred five) 205

LESSON ACTIVITY

Before Using the Page

- Display sets of coins consisting of various combinations of quarters, dimes, nickels, and pennies (values to 50 cents). Have children count to determine the value of each set of coins.
- Display a set of coins at random (values to 50 cents). Have a child place the coins in order of value from greatest to least and count to determine the value of the set of coins. Repeat with other sets of coins.
- Display an item showing a price of 28 cents. From a supply of coins have a child choose the coins required for that amount, say, a quarter and three pennies. Have other children, in turn, choose other sets of coins to show a value of 28 cents. If a child suggests using 28 pennies, discuss why such a set would be inconvenient. After each set of coins is chosen, have the child count to check her/his work. When all the sets have been formed, ask the children to identify the set that has the fewest coins. Repeat this activity for other items having prices to 50

cents. Emphasize the different combinations of coins for each price.

- Challenge the children to show a set of coins having a value of 39 cents, without using a quarter. Have them show a set of coins having a value of 16 cents, without using a dime. Repeat several times with other examples.
- Challenge the children to show a set of coins having a value of 40 cents, using as few coins as possible. Repeat several times with other examples.

Using the Page

- Read the words at the top of the page with the children. Elicit from them that they are to draw the coins needed to buy each rock. Ask what coins have a value of 15 cents. Lead them to suggest a dime and a nickel, or three nickels, or a dime and five pennies as possible sets of coins worth 15 cents. Encourage the children to use as few coins as possible in each set. Let the children use coins to help them to decide which coins are needed for each value. When the children have chosen the coins having the required value, have the children draw pictures of the coins.

OBJECTIVE

Complete basic addition and subtraction facts, sums and minuends to 10

Materials

counters, flash cards for addition and subtraction facts having sums and minuends to 10, a set of number concept cards for 0 to 10 and crayons for each child

RELATED ACTIVITIES

- You may wish to have the children play the game "Space Station" in groups of four, to practise addition and subtraction facts. The game is described on page T277.

Add or subtract.

$1 + 5 = \underline{6}$	$\begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array}$	$2 + 3 = \underline{5}$
$\begin{array}{r} 3 \\ + 6 \\ \hline 9 \end{array}$	$\begin{array}{r} 7 \\ - 4 \\ \hline 3 \end{array}$	$\begin{array}{r} 9 \\ - 7 \\ \hline 2 \end{array}$
$9 - 3 = \underline{6}$	$\begin{array}{r} 8 \\ + 2 \\ \hline 10 \end{array}$	$8 - 4 = \underline{4}$
$\begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array}$	$\begin{array}{r} 8 \\ - 7 \\ \hline 1 \end{array}$	$\begin{array}{r} 10 \\ - 9 \\ \hline 1 \end{array}$
$8 - 3 = \underline{5}$	$\begin{array}{r} 10 \\ - 10 \\ \hline 0 \end{array}$	$2 + 4 = \underline{6}$
$\begin{array}{r} 2 \\ + 7 \\ \hline 9 \end{array}$	$\begin{array}{r} 1 \\ + 2 \\ \hline 3 \end{array}$	$\begin{array}{r} 9 \\ - 8 \\ \hline 1 \end{array}$
$7 - 2 = \underline{5}$	$\begin{array}{r} 3 \\ + 7 \\ \hline 10 \end{array}$	$2 + 2 = \underline{4}$
$\begin{array}{r} 7 \\ + 0 \\ \hline 7 \end{array}$	$\begin{array}{r} 10 \\ - 8 \\ \hline 2 \end{array}$	$\begin{array}{r} 10 \\ - 7 \\ \hline 3 \end{array}$
$8 - 2 = \underline{6}$	$\begin{array}{r} 6 \\ + 4 \\ \hline 10 \end{array}$	$\begin{array}{r} 8 \\ - 1 \\ \hline 7 \end{array}$
		$3 + 2 = \underline{5}$

206 (two hundred six)

Addition and subtraction practice: sums and minuends to 10

LESSON ACTIVITY

Before Using the Page

- Use flash cards to review addition and subtraction facts having sums and minuends to 10. When you display a flash card, have each child hold up the appropriate number concept card so that the side with the numeral is visible for checking. Some children may need to use their counters.

Using the Page

- Tell the children to take care to note whether the operation indicated for each exercise is addition or subtraction. Some children may need to use their counters. After you check their answers, have the children color inside the shapes according to the following code.

If your answer is 1, 2, or 3, color the shape green.

If your answer is 4, 5, or 6, color the shape red.

If your answer is 7, 8, or 9, color the shape blue.

If your answer is 0 or 10, color the shape yellow.

If the children follow the instructions carefully, a symmetrically colored design will result.

LESSON OUTCOME

Identify a set of tens and a set of ones and write the corresponding standard numeral, numbers from 51 to 75

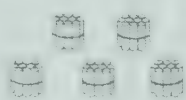
Materials

objects for grouping by tens

RELATED ACTIVITIES

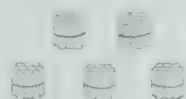
- Prepare cards showing pictures of tens and ones for numbers to 75. Have the children record each number represented. Prepare another set of cards that show only the numerals and have the children draw the tens and ones required.

Complete.



5 tens 1 one

51



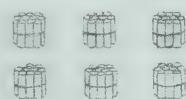
5 tens 4 ones

54



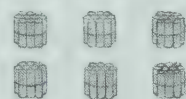
5 tens 9 ones

59



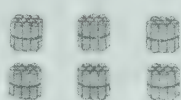
6 tens 0 ones

60



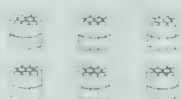
6 tens 5 ones

65



6 tens 3 ones

63



6 tens 7 ones

67



7 tens 0 ones

70



7 tens 3 ones

73



7 tens 5 ones

75

Introduction to the numbers 51 to 75 using tens and ones

(two hundred seven) 207

LESSON ACTIVITY

Before Using the Page

- Display from one to four tens and from one to nine ones to review the numbers from 10 to 49. For each number, ask how many tens there are and how many ones. Have a child make a final statement for each number; for example, "Three tens and five ones are thirty-five." Have another child write the numeral on the chalkboard. Repeat several times.
- Display three tens and nine ones. Have a child include one more single object and then make the ten single objects into a group of ten. Ask how many there are. By including one more single object each time have the children work up to 49. As each number is considered, have a child write the corresponding numeral on the chalkboard.

When four tens and nine ones have been displayed, include one more object and ask how many there are. Have a child make the ten single objects into a group of ten. There are now five groups of ten and zero single objects. Ask what special name there is for five tens (fifty). Include one more single

object each time and repeat the earlier procedure. When there are five tens and nine ones, include one more object and have a child make a group of ten. There are now six groups of ten and zero single objects. Ask what special name there is for six tens (sixty). Continue to include one more object each time until there are six tens and nine ones. Repeat the procedure that you used for five tens and nine ones and review the word *seventy*. Continue to include one more object each time until there are seven tens and five ones.

- Have several children choose groups of ten and single objects to illustrate numbers that you choose. For example, if you ask one child to illustrate "sixty-five", the child should show six tens and five ones and write 65 on the chalkboard.

Using the Page

- Discuss the first exercise with the children. Ask how many tens there are and how many ones. Have them trace over the dotted 51. Then let the children work independently. You may wish to have the children work with objects for grouping to help them to complete the exercises and check their work.

LESSON OUTCOME

Identify a set of tens and a set of ones and write the corresponding standard numeral, numbers from 76 to 99

Materials

objects for grouping by tens

RELATED ACTIVITIES

- Prepare two sets of cards as suggested on page T267 for the numbers from 75 to 99, and have the children work with them.
- Children may work singly, in pairs, or in small groups for the following activity to reinforce their understanding of place value.

Prepare a set of cards for the numbers from 10 to 99, a container with two compartments, one labelled "tens" and the other labelled "ones", colored sticks for tens and plain sticks for ones. Place the cards in a pile in front of the children and ask the first child to choose a card. If the card shows 57, the child places five colored sticks in the tens' compartment and seven plain sticks in the ones' compartment. A picture on the back of each card will make it possible for the children to check their own work.

Complete.

	7 tens 6 ones	76
	8 tens 0 ones	80
	8 tens 8 ones	88
	8 tens 4 ones	84
	8 tens 7 ones	87

	9 tens 0 ones	90
	9 tens 5 ones	95
	9 tens 6 ones	96
	9 tens 2 ones	92
	9 tens 9 ones	99

208 (two hundred eight)

Introduction to the numbers 76 to 99 using tens and ones

LESSON ACTIVITY

Before Using the Page

- Follow the procedure suggested on page T267 and review the number of tens and the number of ones for numbers to 75.
- Name numbers and have the children illustrate them by using groups of tens and ones. Have children write the corresponding numerals on the chalkboard.
- Have the children count by including one more single object each time. For example, if you start at 45, have the children count in turn or in unison. When the number 75 is stated, have a child illustrate it with seven tens and five ones. Include another single object and have a child state how many tens and how many ones there are and write the numeral on the chalkboard. Continue this procedure until there are seven tens and nine ones on display. Using the same procedure as suggested on page T267, proceed from 79 to 80. Review the word *eighty*. Continue the procedure until there are eight tens and nine ones on display. Proceed from 89 to 90, and review the word *ninety*. Continue to 99.

- Write two-place numerals at random on the chalkboard. Have children, in turn, tell how many tens and how many ones they would need to illustrate each number.

Using the Page

- Discuss the first exercise with the children. Ask how many tens there are and how many ones. Have them trace over the dotted 76. Then let the children continue on their own. You may wish to have the children work with objects for grouping to help them to complete the exercises and check their work.

Show the number that is 1 more.

tens	ones	
	9	
1	0	10

tens	ones	
5	9	
6	0	60

tens	ones	
1	9	
2	0	20

tens	ones	
6	9	
7	0	70

tens	ones	
2	9	
3	0	30

tens	ones	
7	9	
8	0	80

tens	ones	
3	9	
4	0	40

tens	ones	
8	9	
9	0	90

tens	ones	
4	9	
5	0	50

tens	ones	
9	9	
10	0	100

Working with groups of tens, to 100

(two hundred nine) 209

LESSON OUTCOME

Interpret a place-value chart for two-place numerals

Materials

objects for grouping by tens, pocket chart (See page xxxi.)

Vocabulary

one hundred (optional)

RELATED ACTIVITIES

- Have children choose groups of tens and ones and place them in the pocket chart. (See page xxxi.) Have other children write the number of tens and the number of ones in the appropriate places in a place-value chart on the chalkboard.
- Play the game "Rockets Away" described on page T277.

LESSON ACTIVITY

Before Using the Page

- Display two tens and three ones. Ask how many tens there are, how many ones there are, and what number is represented. On the chalkboard, draw a place-value chart for tens and ones similar to those shown on the page. Write 2 in the tens' place and 3 in the ones' place. Repeat several times.
- Start with nine single objects and have a child include one more, state how many there are, and fasten them together to make a group of ten. Have another child write the number of tens and the number of ones in the place-value chart on the chalkboard. Continue by including one more each time. When children say, "one ten and one one", "one ten and two ones", and so on, have other children write the appropriate numerals in the place-value chart.

Have a child display one ten and nine ones and then include one more. Have another child make a group of ten and write 2 and 0 in the appropriate columns in the place-value chart. Continue the procedure for 29, 39, . . . , 99.

- Display nine tens and nine ones. Have a child include one more. Ask how many there are (nine tens and ten ones). Have a child fasten the ten ones together to make a group of ten. Ask how many there are now (ten tens). Ask what number comes after nine tens and nine ones (ten tens). Do not regroup the ten tens; it is not necessary to introduce 100 as a three-place numeral at this time. This concept will be developed in Book 2. Simply write the numeral 100 on the chalkboard, and mention that the name of the number that comes after 99 is *one hundred*.

Using the Page

- Read the instruction to the children. Discuss the first exercise by asking how many ones are shown. Ask the children to think of one more one and say how many ones there would be. Have the children trace over the dotted 1 and the dotted 0. Ask what number is one greater than nine. Have the children trace over the dotted 10. Discuss the second exercise in a similar way and then let the children work independently. After the children have completed the page, have them count by tens to one hundred.

LESSON OUTCOME

Count and order the numbers to 100

Materials

objects for grouping by tens

RELATED ACTIVITIES

- Make a work sheet of the number chart shown on page T343. Have the children color patterns that result from counting by twos, threes, and fours. Let the children make patterns of their own and explain how they were made.
- You may wish to give each child a copy of page T345 and have them write the numerals in each column. This activity will emphasize adding ten to any number up to 90.
- Prepare a dot-to-dot picture in which the dots are labelled from 1 to 100 (or less). Some children may prefer to use pictures from magazines and make their own dot-to-dot pictures.

Show the missing numbers.

1	2	3	4	5	6	7	8	9	10	X
11	12	13	14	15	16	17	18	19	20	X
21	22	23	24	25	26	27	28	29	30	X
31	32	33	34	35	36	37	38	39	40	X
41	42	43	44	45	46	47	48	49	50	X
51	52	53	54	55	56	57	58	59	60	X
61	62	63	64	65	66	67	68	69	70	X
71	72	73	74	75	76	77	78	79	80	X
81	82	83	84	85	86	87	88	89	90	X
91	92	93	94	95	96	97	98	99	100	X

Complete.

2	4	6	8	10	12	14	16	18
11	13	15	17	19	21	23	25	27
45	46	47	48	49	50	51	52	53
60	62	64	66	68	70	72	74	76
81	83	85	87	89	91	93	95	97
92	93	94	95	96	97	98	99	100

Count by tens and use an X to mark each ten. Count by fives and ring the fives.

210 (two hundred ten)

Counting and ordering the numbers to 100

LESSON ACTIVITY

Before Using the Page

- By now the children should have a good understanding of the numbers to 100 and their corresponding two-place numerals. Review numbers to 100 by displaying groups of tens and single ones. Have children state the numbers represented and write the corresponding numerals on the chalkboard.
- Have children count by ones, twos, and tens. State different ranges and have children work within the given range. For example, count by ones from 32 to 54; count by twos from 24 to 38; count by tens from 40 to 90.
- Write numerals such as 76, 87, 60, 91, 39, and 45 on the chalkboard. Ask children to display groups of tens and single ones to illustrate each number. Have each child state how many tens and how many ones there are for her/his number. For 76, for example, the child should say, "I have seven tens and six ones. The number is seventy-six."

Using the Page

- Read the instruction at the top of the page to the children. Then have them print all the numerals in order to complete the chart. After the chart has been completed, have the children start at 10, count by tens, and mark an X on each ten. Then have the children start at 5, count by fives, and ring each numeral. The children will be interested to see that inside every tenth square there is an X and also a ring.
- For the second part of the page, have the children complete the sequences of numbers. Some children may need to refer to the completed chart for assistance.

What number comes before ?

<u>19</u> 20	<u>27</u> 28	<u>28</u> 29	<u>39</u> 40
<u>53</u> 54	<u>62</u> 63	<u>64</u> 65	<u>71</u> 72
<u>80</u> 81	<u>88</u> 89	<u>89</u> 90	<u>98</u> 99

What number comes after ?

19 <u>20</u>	24 <u>25</u>	28 <u>29</u>	39 <u>40</u>
46 <u>47</u>	47 <u>48</u>	55 <u>56</u>	63 <u>64</u>
76 <u>77</u>	89 <u>90</u>	96 <u>97</u>	98 <u>99</u>

What number comes between ?

9 <u>10</u> 11	26 <u>27</u> 28	49 <u>50</u> 51
58 <u>59</u> 60	89 <u>90</u> 91	78 <u>79</u> 80
69 <u>70</u> 71	34 <u>35</u> 36	98 <u>99</u> 100

Add.

$\begin{array}{r} 3 \\ +4 \\ \hline 7 \end{array}$	$\begin{array}{r} 6 \\ +3 \\ \hline 9 \end{array}$	$\begin{array}{r} 5 \\ +1 \\ \hline 6 \end{array}$	$\begin{array}{r} 2 \\ +3 \\ \hline 5 \end{array}$	$\begin{array}{r} 4 \\ +6 \\ \hline 10 \end{array}$	$\begin{array}{r} 7 \\ +3 \\ \hline 10 \end{array}$	$\begin{array}{r} 1 \\ +8 \\ \hline 9 \end{array}$	$\begin{array}{r} 6 \\ +2 \\ \hline 8 \end{array}$
$\begin{array}{r} 2 \\ 3 \\ +4 \\ \hline 9 \end{array}$	$\begin{array}{r} 5 \\ 3 \\ +1 \\ \hline 9 \end{array}$	$\begin{array}{r} 0 \\ 4 \\ +4 \\ \hline 8 \end{array}$	$\begin{array}{r} 3 \\ 2 \\ +3 \\ \hline 8 \end{array}$	$\begin{array}{r} 2 \\ 4 \\ +2 \\ \hline 8 \end{array}$	$\begin{array}{r} 2 \\ 3 \\ +5 \\ \hline 10 \end{array}$	$\begin{array}{r} 4 \\ 5 \\ +1 \\ \hline 10 \end{array}$	$\begin{array}{r} 3 \\ 1 \\ +3 \\ \hline 7 \end{array}$

Identifying numbers before, after, and between numbers to 100;
addition practice

(two hundred eleven) 211

LESSON OUTCOME

Identify numbers before, after, and between whole numbers to 100; add two and three numbers, sums to 10

Materials

number line, a copy of page T343 for each child, counters for each child

RELATED ACTIVITIES

- For children who are able, have them try to write as many number sentences as they can using three different addends (zero is excluded). The sums may be 6, 7, 8, 9, and 10. The possible addition sentences are listed below. Note that the order of the addends may vary.

$1 + 2 + 3 = 6$
 $1 + 2 + 4 = 7$
 $1 + 2 + 5 = 8$
 $1 + 2 + 6 = 9$
 $1 + 2 + 7 = 10$
 $1 + 3 + 4 = 8$
 $1 + 3 + 5 = 9$
 $1 + 3 + 6 = 10$
 $1 + 4 + 5 = 10$

LESSON ACTIVITY

Before Using the Page

- Display a number line showing from 0 to 100. Ask questions of the following types:

“What number comes before 78?”
 “What number comes after 69?”
 “What number comes between 84 and 86?”
 “What number comes after 32 and before 34?”
 “Does 53 come before or after 51?”

Repeat the questions for as many numbers as possible in the time available.

- Give each child a copy of page T343. Have the children mark or color squares according to instructions of the following types:

“Ring the number that comes before 40.”
 “Mark with a \checkmark the number that comes after 67.”
 “Mark with an X the number that comes between 49 and 51.”
 “Color red the number of tens between 3 tens and 5 tens.”
 “Color yellow the number of tens after 6 tens.”

“Color green the number of tens before 8 tens.”

“Color blue the number that is five greater than 20.”

“Color brown the number that is five less than 45.”

Using the Page

- Discuss with the children the three instructions for the first three sets of exercises. Complete the first exercise in each set with the children and then let them work independently. Allow the children to refer to the number line or to the number chart, if necessary. By now some of the children should be able to write the answers by merely thinking of the numbers involved.
- For the addition exercises, provide counters for those children who need them and for those who wish to check their work.

LESSON OUTCOME

Identify a number one greater than or two greater than a given number, numbers to 100; complete basic addition facts for sums to 10 within a given time

Materials

number line, number chart for 1 to 100 (a copy of page T343)

Background

You may wish to give the test on this page more than once to determine how the children are improving. Emphasize that the children are trying to improve their own performance and not trying to compete with other children in the class.

RELATED ACTIVITIES

- Have the children write as many of the basic addition facts having sums of 7, or 8, or 9, or 10 as they can in a given time.

What number is 1 greater than each ?

14	<u>15</u>	23	<u>24</u>	27	<u>28</u>	36	<u>37</u>
47	<u>48</u>	49	<u>50</u>	53	<u>54</u>	58	<u>59</u>
64	<u>65</u>	79	<u>80</u>	87	<u>88</u>	96	<u>97</u>

What number is 2 greater than each ?

8	<u>10</u>	12	<u>14</u>	21	<u>23</u>	26	<u>28</u>
27	<u>29</u>	39	<u>41</u>	48	<u>50</u>	52	<u>54</u>
55	<u>57</u>	69	<u>71</u>	76	<u>78</u>	93	<u>95</u>

See how many you can do in 2 minutes.

$1 + 1 =$	<u>2</u>	$2 + 2 =$	<u>4</u>	$3 + 0 =$	<u>3</u>
$2 + 3 =$	<u>5</u>	$5 + 1 =$	<u>6</u>	$4 + 2 =$	<u>6</u>
$6 + 0 =$	<u>6</u>	$4 + 3 =$	<u>7</u>	$1 + 6 =$	<u>7</u>
$2 + 5 =$	<u>7</u>	$4 + 4 =$	<u>8</u>	$7 + 2 =$	<u>9</u>
$6 + 4 =$	<u>10</u>	$8 + 2 =$	<u>10</u>	$5 + 4 =$	<u>9</u>
$3 + 5 =$	<u>8</u>	$1 + 9 =$	<u>10</u>	$0 + 5 =$	<u>5</u>
$1 + 8 =$	<u>9</u>	$7 + 0 =$	<u>7</u>	$1 + 3 =$	<u>4</u>

212 (two hundred twelve)

Identifying numbers one or two greater than a given number; addition practice

LESSON ACTIVITY

Before Using the Page

- Display the number line used for page 211 and review the concept *greater than*.

Point to a number on the number line and have a child state the number that is one greater than the given number. Repeat several times. You may also wish to use a copy of the number chart on page T343 for this activity.

Point to a number on the number line and have a child state the number that is two greater than the given number. Repeat several times.

- Count aloud with the children. Stop when you come to a certain number and ask a child to state the number that is one greater than (two greater than) that number. Repeat many times.
- On the chalkboard, write two numerals that show the same number of ones, for example, 43 and 53. Ask which number is greater than the other and why. Lead the children to the follow-

ing pattern of thinking: 5 tens are more than 4 tens. So 53 is greater than 43. Repeat several times.

- On the chalkboard, write two numerals that show the same number of tens, for example, 23 and 27. Ask which number is greater than the other and why. Lead the children to the following pattern of thinking: 2 tens are the same as 2 tens, but there are 3 ones and 7 ones. Because 7 ones are more than 3 ones, 27 is greater than 23. Repeat several times.

Using the Page

- Discuss with the children the two instructions for the first two sets of exercises. Complete the first exercise in each set with the children and then let them work independently.
- The timed test on this page is for reviewing and reinforcing addition facts having sums to 10. The children should not feel that they must complete the test in the time suggested. If your groups reach this page at different times, it may be necessary to allow more time for the slower groups. Avoid unfair competition between faster and slower workers by testing them separately.

What number is 1 less than each?

<u>26</u> 27	<u>28</u> 29	<u>29</u> 30	<u>30</u> 31
<u>37</u> 38	<u>41</u> 42	<u>45</u> 46	<u>54</u> 55
<u>63</u> 64	<u>75</u> 76	<u>82</u> 83	<u>89</u> 90

What number is 2 less than each?

<u>15</u> 17	<u>23</u> 25	<u>27</u> 29	<u>28</u> 30
<u>29</u> 31	<u>36</u> 38	<u>38</u> 40	<u>42</u> 44
<u>54</u> 56	<u>58</u> 60	<u>75</u> 77	<u>87</u> 89

See how many you can do in 2 minutes.

8 - 0 = <u>8</u>	9 - 4 = <u>5</u>	7 - 5 = <u>2</u>
10 - 1 = <u>9</u>	5 - 2 = <u>3</u>	4 - 3 = <u>1</u>
8 - 8 = <u>0</u>	10 - 9 = <u>1</u>	10 - 10 = <u>0</u>
10 - 4 = <u>6</u>	7 - 3 = <u>4</u>	9 - 2 = <u>7</u>
3 - 0 = <u>3</u>	8 - 2 = <u>6</u>	10 - 3 = <u>7</u>
10 - 2 = <u>8</u>	9 - 1 = <u>8</u>	9 - 6 = <u>3</u>
4 - 4 = <u>0</u>	5 - 0 = <u>5</u>	8 - 6 = <u>2</u>

Identifying numbers one or two less than a given number;
subtraction practice

(two hundred thirteen) 213

LESSON OUTCOME

Identify a number one less than or two less than a given number, numbers to 100; complete basic subtraction facts for minuends to 10 within a given time

Materials

number line, number chart for 1 to 100 (a copy of page T343)

RELATED ACTIVITIES

- Play the following game to review addition and subtraction facts. Give each player a random number of popsicle sticks (not more than ten). The first player separates the sticks into two groups, determines how many there are in each group, hides them from view, and says, "I have two groups that make eight. How many are there in each group?" The other players take turns guessing.

"Are there five and three?"

Answer: "No, not five and three."

"Are there four and four?"

Answer: "No, not four and four."

"Are there one and seven?"

Answer: "Yes, there are one and seven."

The first player then shows the two groups to the other players. The player who guessed correctly becomes the leader and the game continues.

LESSON ACTIVITY

Before Using the Page

- Display the number line used for page 212 and review the concept *less than*. Remind the children that the greater the number is, the greater is the distance of that number from zero on the number line. Point to numbers and have children state numbers that are one less than or two less than the numbers indicated. You may also wish to use a copy of the number chart on page T343 for this activity.

- Use the flip chart suggested in *Related Activities* on page T242. Ask a child to choose two cards at random. Ask what number is two less than that number, and then have another child count backward to check the number. Repeat several times.

- On the chalkboard, write two numerals that show the same number of ones, for example, 68 and 78. Ask which number is less than the other and why. Ask the children to reason as follows: 6 tens are fewer than 7 tens, so 68 is less than 78. Repeat several times.

- On the chalkboard, write two numerals that show the same number of tens, for example, 32 and 34. Ask which number is less than the other and why. Ask the children to reason as follows: 3 tens are the same as 3 tens, but there are 2 ones and 4 ones. Because 2 ones are fewer than 4 ones, 32 is less than 34. Repeat several times.

Using the Page

- Discuss with the children the two instructions for the first two sets of exercises. Complete the first exercise in each set with the children and then let them work independently. Allow the children to refer to the number line or to the number chart, if necessary. It is preferable, however, to have the children think about the numbers involved rather than merely copy them from a given sequence.

- For the timed test involving subtraction facts, see the comments on page T272. You may wish to vary the methods for giving the test; for example, make a work sheet, write the subtraction sentences on the chalkboard or on chart paper, or state the sentences orally.

LESSON OUTCOME

Measure capacity using non-standard units

Materials

containers of different sizes, baby-food jars to be used as non-standard units of capacity, water or sand, plastic sheeting

Vocabulary

fill, full

RELATED ACTIVITIES

- Collect containers suitable for the children to use for measuring capacity, for example, tin cans in several different sizes, glass jars, plastic tubs. A baby-food jar makes an excellent non-standard unit of capacity.

Have the children work with the containers during their free time. Emphasize the idea of estimating the number of small containers needed to fill a larger container before they do the actual measuring. You may wish to have them write down each estimate before measuring.

<p>Complete.</p> <p>4 's fill</p> <p><u>8</u> 's fill</p>	<p>3 's fill</p> <p><u>6</u> 's fill</p>
<p>5 's fill</p> <p><u>10</u> 's fill</p>	<p>2 's fill</p> <p><u>4</u> 's fill</p>
<p>Ring the correct word.</p> <p>fills</p> <p>Will fill ? <input checked="" type="radio"/> Yes <input type="radio"/> No</p>	
<p>fill</p> <p>Will fill ? <input type="radio"/> Yes <input checked="" type="radio"/> No</p>	

214 (two hundred fourteen)

Measuring capacity using non-standard units

LESSON ACTIVITY

Before Using the Page

- Display a non-standard unit of capacity (a baby-food jar) and a can. Ask the children to guess how many of the small jars will be needed to fill the can. Have children check their guesses by filling the small jar and emptying it into the can until the can is "full". (See the suggestion for preparing containers on page T251.)

Because children are not very good at remembering how many times a container has been filled and emptied, it may be helpful to have a box of beads and pieces of string beside the children as they work. When the small jar is emptied each time, have a child place a bead on a string. Have the children count the beads when the can is "full". The number tells them how many small jars are needed to fill the large container.

- Choose two containers and ask the children to identify which they think holds more. Have them use the non-standard unit of capacity to fill each container and determine which holds more of the small jars and how many more.

- Choose a large jar or a pitcher, fill it with water, and have children estimate how many of the small jars can be filled from it. Have children empty the water into the small jars to find how many can be filled.
- Choose a can that will hold about three or four times as much as the non-standard unit of capacity. Have children find how many non-standard unit containers will fill the can. Display another can of the same size. Ask the children if they can tell how many non-standard unit containers will fill this can. Ask them how many non-standard unit containers will fill the two cans together. Repeat this activity with other containers and different non-standard unit containers.

Using the Page

- Read the instructions and the words of each problem with the children. Have them interpret the drawings of the containers and then write their answers. Some children may need considerable guidance in order to complete the problems successfully.

Write the related facts.

OBJECTIVE

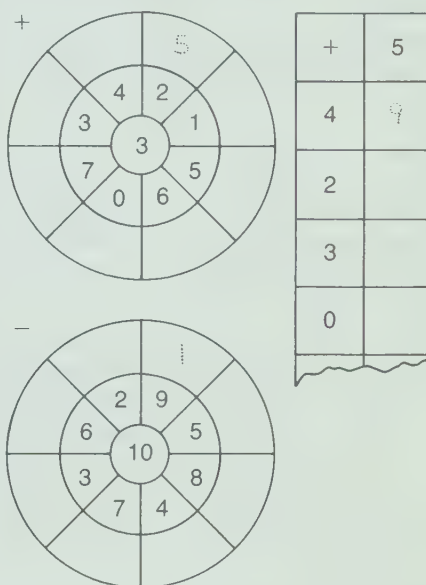
Complete basic addition and subtraction facts, sums and minuends to 10

Materials

ten counters such as transparent bingo chips, overhead projector

RELATED ACTIVITIES

- Provide the children with copies of page T338. Have them complete number wheels and tables similar to the following for further practice in addition and subtraction.



$$\begin{array}{r} 4 + 5 = 9 \\ 9 - 5 = 4 \end{array} \quad \begin{array}{r} 5 + 4 = 9 \\ 9 - 4 = 5 \end{array}$$

$$\begin{array}{r} 7 + 3 = 10 \\ 10 - 3 = 7 \end{array} \quad \begin{array}{r} 3 + 7 = 10 \\ 10 - 7 = 3 \end{array}$$

$$\begin{array}{r} 8 + 1 = 9 \\ 9 - 1 = 8 \end{array} \quad \begin{array}{r} 1 + 8 = 9 \\ 9 - 8 = 1 \end{array}$$

$$\begin{array}{r} 6 + 4 = 10 \\ 10 - 4 = 6 \end{array} \quad \begin{array}{r} 4 + 6 = 10 \\ 10 - 6 = 4 \end{array}$$

Complete.

$$\begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 4 \\ + 2 \\ \hline 6 \end{array} \quad \begin{array}{r} 6 \\ + 2 \\ \hline 8 \end{array} \quad \begin{array}{r} 8 \\ + 2 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 9 \\ - 2 \\ \hline 7 \end{array} \quad \begin{array}{r} 7 \\ - 2 \\ \hline 5 \end{array} \quad \begin{array}{r} 5 \\ - 2 \\ \hline 3 \end{array} \quad \begin{array}{r} 3 \\ - 2 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 6 \\ + 0 \\ \hline 6 \end{array} \quad \begin{array}{r} 0 \\ + 6 \\ \hline 6 \end{array} \quad \begin{array}{r} 1 \\ + 5 \\ \hline 6 \end{array} \quad \begin{array}{r} 5 \\ + 1 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 8 \\ - 3 \\ \hline 5 \end{array} \quad \begin{array}{r} 8 \\ - 5 \\ \hline 3 \end{array} \quad \begin{array}{r} 10 \\ - 1 \\ \hline 9 \end{array} \quad \begin{array}{r} 10 \\ - 9 \\ \hline 1 \end{array}$$

$$10 - 5 = 5$$

$$5 + 3 = 8$$

$$8 - 4 = 4$$

$$4 + 3 = 7$$

$$7 - 1 = 6$$

$$6 + 3 = 9$$

$$9 - 7 = 2$$

$$2 + 8 = 10$$

Addition and subtraction practice: sums and minuends to 10

(two hundred fifteen) 215

LESSON ACTIVITY

Before Using the Page

- Display nine counters on the overhead projector. Ask a child to separate the counters into two groups and tell how many there are in each group. Ask for an addition sentence that describes the situation and write it on the chalkboard. Elicit from the children another addition sentence and two subtraction sentences to obtain the four related facts.

Repeat the procedure for several number combinations for sums of 9. Then adapt the activity for the number combinations for sums of 10.

Using the Page

- Direct the children's attention to the first group of rockets at the top of the page. Ask how many rockets there are and have the children trace over the dotted 4. Ask how many rockets there are in the second group and have the children trace over the dotted 5. Ask how many rockets there are in all and have the children trace over the dotted 9. Use a similar procedure for $9 - 5 = 4$. Point out that there will be one more addition

sentence and one more subtraction sentence for the numbers 4, 5, and 9. You may wish to discuss the other illustrations to ensure that the children understand what is required.

- For the second part of the page, caution the children to note whether the operation indicated is addition or subtraction.

OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

RELATED ACTIVITIES

- Adapt the game suggested on page T273 for reviewing subtraction facts as follows. The first player says, "I have eight sticks. Here is one group." The remaining sticks are held behind the player's back. The other players determine how many sticks are displayed and then determine how many are hidden. The player who gives the correct answer first becomes the leader.
- Play the game "Comparison Bingo" described on page T277.

Complete.

2	4	6	<u>8</u>	10	<u>12</u>	14	<u>16</u>	<u>18</u>
1	3	5	<u>7</u>	9	<u>11</u>	13	<u>15</u>	<u>17</u>
<u>36</u>	37	38	39	<u>40</u>	41	42	<u>43</u>	<u>44</u>
84	<u>85</u>	86	87	88	<u>89</u>	90	<u>91</u>	<u>92</u>

Complete.

$2 + 1 = \underline{3}$	$4 + 2 = \underline{6}$	$3 + 4 = \underline{7}$
$7 - 1 = \underline{6}$	$8 - 0 = \underline{8}$	$6 - 3 = \underline{3}$
$\begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array}$	$\begin{array}{r} 2 \\ + 3 \\ \hline 5 \end{array}$	$\begin{array}{r} 5 \\ + 4 \\ \hline 9 \end{array}$
$\begin{array}{r} 9 \\ - 7 \\ \hline 2 \end{array}$	$\begin{array}{r} 5 \\ - 3 \\ \hline 2 \end{array}$	$\begin{array}{r} 8 \\ - 6 \\ \hline 2 \end{array}$

Write the related facts.



$$\underline{3 + 6 = 9}$$

$$\underline{9 - 6 = 3}$$

$$\underline{6 + 3 = 9}$$

$$\underline{9 - 3 = 6}$$



$$\underline{8 + 2 = 10}$$

$$\underline{10 - 2 = 8}$$

$$\underline{2 + 8 = 10}$$

$$\underline{10 - 8 = 2}$$

What number ?

$$5 \text{ tens } 3 \text{ ones } \underline{53}$$

$$7 \text{ tens } 5 \text{ ones } \underline{75}$$

$$8 \text{ tens } 4 \text{ ones } \underline{84}$$

$$9 \text{ tens } 8 \text{ ones } \underline{98}$$

How much ?

$$\underline{26} \text{¢}$$

$$\underline{32} \text{¢}$$

216 (two hundred sixteen)

CHECKUP

LESSON ACTIVITY

Before Using the Page

- Choose preliminary activities from those suggested in this unit to review the order of the numbers to 100, finding the value (less than 50 cents) of a set of coins, addition and subtraction facts having sums to 10, related facts having sums to 10, writing standard numerals for tens and ones, and working with non-standard units of capacity.

The nature of the activities and the time spent on them will depend on the abilities of the children. You may prefer to spend a minimum of time on preliminary activities and give more help to individual children when they are working on the page and after you have spotted the difficulties that they encounter.

Using the Page

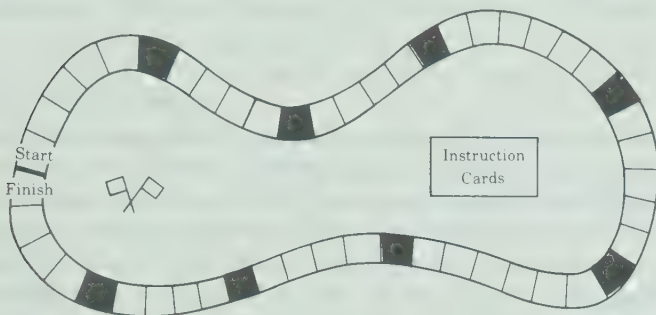
- Discuss the different types of exercises with the children to ensure that they know what to do for this *Checkup*. Then let the children work independently. Their performance on this page will help you determine what reteaching is necessary.

Games and Activities

Car Rally (Game for page 195)

Materials

- a game board showing a race track similar to the one below
- a die marked 2, 4, 6, 8, 10, and 12
- a set of cards with instructions such as MISS A TURN, GO BACK TWO
- a marker for each player



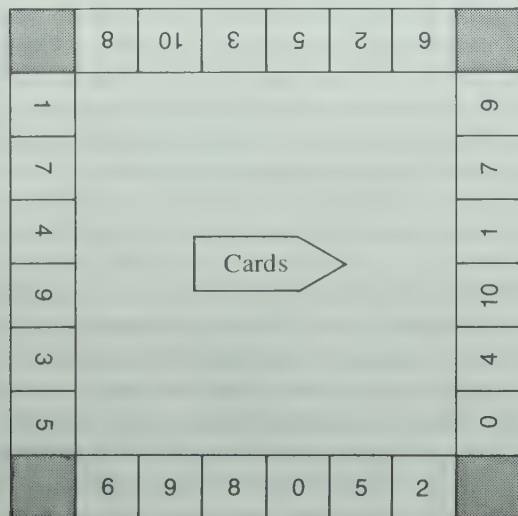
Rules

- The instruction cards are placed face down in the middle of the track.
- The first player throws the die. If the die shows 6, the player counts "2, 4, 6" and advances one space for each number named.
- If the player lands on a red region, an instruction card must be drawn and the instruction followed.
- The player who first crosses the FINISH line is the winner.

Space Station (Game for page 206)

Materials

- a set of 30 or more cards in the shape of rockets for addition and subtraction facts having sums to 10 (a card showing $9 - 3$, for example, indicates that a "rocket" is to "land" on 6)
- a game board, similar to the one shown below, with landing spaces large enough for "rockets" to land



Rules

- Each player chooses a space station.
- The first player turns over a card.
- If the sum (difference) appears in her/his space station, the rocket (card) may land there.
- If the answer does not appear in her/his space station, the rocket cannot land and the player places the card at the bottom of the pile.
- The second player turns over a card and the game continues.
- The player whose space station is filled first is the winner.

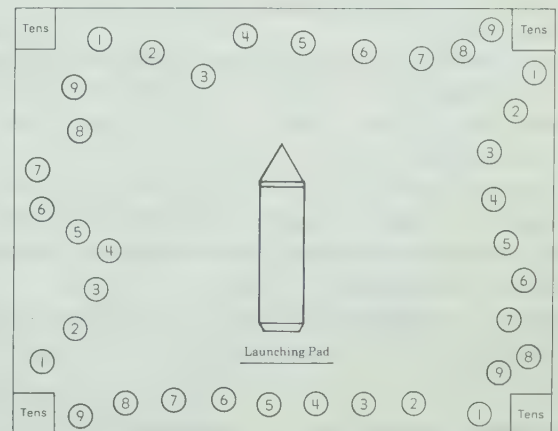
Rockets Away (Game for page 209)

Materials

- a game board similar to the one shown below
- at least 50 beads
- at least 50 popsicle sticks
- one regular die
- a marker for each player

Rules

- From two to four players place their markers at their starting positions.
- The players take turns throwing the die. Each player takes the number of beads indicated by the die, advances that number of steps, and places her/his marker to indicate the position on the board.
- When a player has collected ten beads, he/she can exchange them for one popsicle stick.
- The player who first collects ten popsicle sticks can enter the rocket for a trip to the moon (is the winner).



Comparison Bingo (Game for page 216)

Prepare cards showing different displays of numbers from 0 to 99 for reviewing numbers one greater than given numbers. Have the children place markers for the numbers that are one greater than the numbers called out. The child who is able to cover all the numerals in a row or a column first is the winner. You may also wish to use these cards for reviewing numbers one less than given numbers (or two greater than or two less than given numbers).

93	54	9	73
10	32	89	18
23	67	48	30
56	81	60	25

46	84	78	50
25	7	62	8
55	39	21	94
16	73	80	27

Unit 11 Overview

In this unit ordinal number concepts are extended to *ninth*. Counting by fives is extended to 100 and children discover the numbers represented by from 1 to 9 sets of five. Basic addition and subtraction facts are developed for sums and minuends of 11 and 12. The fraction concept *one-half* is reviewed as it applies to objects and sets before the concept *one-fourth* is introduced, but this concept is limited to one-fourth of an object or a shape. Simple problems are presented with some words and drawings and children write number sentences to solve them. Word problems for which children are required to make simple drawings are also presented. The metre is presented as a standard linear unit of measurement and activities are suggested for children to relate lengths of common objects to the metre and to use a metre stick to measure lengths in the school environment. The major topics in the lessons are assessed in the *Checkup* at the end of the unit.

Unit Outcomes

Number

- demonstrate an understanding of the ordinal number concepts to *ninth*
- recognize the ordinal number names *first* to *ninth*
- use ordinal number names to *ninth*
- complete addition facts for sums of 11
- complete subtraction facts for minuends of 11
- complete addition facts for sums of 12
- complete subtraction facts for minuends of 12
- count by fives to 100
- determine the numbers represented by one or more groups of five, to 9 fives
- demonstrate an understanding of one-half of a whole and one-half of a set
- identify one-fourth of an object or a shape
- recognize an object or a shape divided into four equal parts
- write a number sentence for a story problem and answer the question of the problem
- illustrate a word problem in an attempt to solve the problem
- complete basic addition and subtraction facts, sums and minuends to 12

Measurement

- recognize a length of one metre
- measure using the metre as a unit of length

Background

Number: The ordinal aspect of number was treated incidentally in Units 2 and 3 while the cardinal concepts were being developed. Briefly, a cardinal number (one, two, three, ...) tells *how many*; an ordinal number (first, second, third, ...) tells *which one*. Both are determined by counting, but there is a basic difference. A cardinal number can be found by starting with any member of a set and counting each member. (There are nine balloons in the set.) An ordinal number, however, is found by starting with one particular member and counting in a certain pattern or direction. (The red balloon is the fourth one.)

References to time may involve cardinal or ordinal concepts. "We were there for five hours" tells how many hours (five), but "It is five o'clock" tells which hour (the fifth hour counting from noon to midnight).

As already stated, a starting point and a pattern or direction are needed to establish the ordinal number of a member of a set. For example, September is the first month of the school year, but the ninth month of the calendar year. In this unit, the children meet all the ordinal names from *first* to *ninth*.

Counting sets of fives is reviewed and extended in this unit. From their experiences the children will see the alternating pattern of the digits 5 and 0 in the ones' place of the numerals. They will also develop further readiness for multiplication by considering sets of fives in such cases as "2 fives are 10" and "3 fives are 15".

Review of the concept one-half should bring out the important properties of all fractions; that is, that the parts must be equal in size for them to have a specific fractional name. Also, fractional parts that have the same name are equal in size only if the whole objects or sets from which they come are of the same size. For example, one-half of one apple is not necessarily equal to one-half of another apple because the apples may differ in size. This aspect may receive further emphasis when one-fourth of an object is considered, if the children first fold a large piece of paper into fourths and then fold a smaller piece into fourths. One-fourth of a set is not considered in Book 1.

As children master more basic addition and subtraction facts they should have opportunities to apply them in solving problems, real ones and ones that are invented. In Unit 10, actions were shown in illustrations and the children wrote number sentences to represent the actions. This type of problem solving lies between the concrete level and the abstract level.

In this unit, one more step is taken toward solving word problems. Situations are first presented with illustrations and a limited amount of reading. The actions of joining and separating are indicated by words in one sentence and are implied by the question of each problem. From these clues the children can visualize the situations and then write the number sentences.

In the next stage, word problems are presented and the children draw the illustrations. Making a picture or a diagram of the elements in a problem situation is recommended as an aid in solving problems, even in more advanced mathematics, because it helps in the visualizing process. Another procedure has the children creating imaginary problem situations from given number sentences. For example, for the number sentence $2 + 5 = 7$, a child might make up a story such as "I picked two flowers. Then I picked five more flowers. I had seven flowers." The child might also draw a picture and write the number sentence below it. All the above approaches are recommended to develop the ability to solve problems.

Measurement: Measurement of length was introduced in Unit 6 and extended in Unit 8 through the use of non-standard units such as the span and other parts of the body, as well as paper clips, pencils, and straws. Variation in the sizes of some of the units made it impossible for accurate and reliable measurements to be made; and the need for a standard unit emerged.

In this unit, the unmarked metre stick is introduced and the children will find that all the metre sticks are of exactly the

same length. It is used first as a comparative unit to find objects longer than, shorter than, and of about the same length as a metre. It is important that children have many opportunities of this type so that the term *metre* can acquire meaning based on actual experience. The metre stick is also used to measure longer lengths and distances in terms of metres.

In the past, direct experience with units of measure was frequently omitted. As a result, many adults have very hazy impressions of the sizes of certain standard units, and absurd and costly estimates are often made. Direct experience with measures can ensure that children learn to know them and use them with accuracy both in estimation and actual measurement.

Teaching Strategies

Addition and subtraction facts with sums and minuends of 11 and 12 are included in Book 1 so that more capable learners can proceed to this level. If this goal is beyond the capabilities of the children in a class, or beyond the school's program for the first year of mathematics, selections of topics and pages will be necessary in this unit and also in Unit 12. The pages affected in this unit are 219, 220, 223, 224, 225, and a few exercises on pages 231, 234, and 235. Several exercises in the *Checkup* on page 236 and in the *Year-End Checkup* on page 248 also involve addition and subtraction facts having sums and minuends of 11 and 12. Review and practice with addition and subtraction facts having sums and minuends to 10 should replace the pages and the exercises that may be deleted. The rest of this unit includes concepts and skills that are suitable for inclusion in the mathematics program for the first year.

Measuring longer distances outside the classroom requires careful preparation so that children may benefit from the experiences. It is suggested that they work in small groups with one unmarked metre stick for each group and one record sheet for each child. Each child should have an opportunity to place the metre stick, mark the end of it, and repeat the procedure while the other children in the group count how many times it is placed for the distance being measured.

For counting by fives, nickels can be used to provide realistic and purposeful experiences for the children. This approach may also be extended to reinforce relationships between fives and tens and also between fives and twenty-fives through the use of dimes and quarters.

As the program offered in Book 1 nears its final lessons, it is important to consider an evaluation of achievements. Several procedures can be used to assess each child's mastery of basic addition and subtraction facts so that steps can be taken to reteach, review, and practise the facts requiring attention. Both oral and written tests may be used in several forms. (These two kinds of tests have advantages and disadvantages that will be mentioned in subsequent paragraphs.) In all cases, the tests must be related to the progress of the children; and, in general, if instruction has been in groups, the testing should also be done in groups. Differences in progress will require different tests.

Facts can be presented orally or by using flash cards and the children can respond by using their number concept cards or by writing the numerals. Although oral responses take less time there would be no record for checking later and for planning review procedures of what facts were tested and what responses each child gave.

Test exercises may be written on the chalkboard or on chart paper and the children may either copy and complete the facts or write only the answers. In this way there is a record of the test item and the answer, but there are two disadvantages. As the child looks up and down from the test to the paper, errors will likely result from copying incorrectly; and these cannot be distinguished from actual errors in recall of facts. Also, if children are left on their own to do a test item, they may resort to manipulative devices. Since these are time-consuming, children may not have time to try all the items. These disadvantages also apply to prepared sheets of test items, and the results of such tests are not reliable in identifying strengths and weaknesses.

Perhaps the most effective testing procedure utilizes prepared sheets of items on which children write their responses at a rate that the teacher sets by reading the items aloud while the children follow on their copies. This procedure provides a record of the items and the answers, and ensures that the responses are made by recall rather than by slower methods. Such a test provides a base for diagnosing difficulties because the responses are either correct or incorrect, and any unanswered items indicate slowness of recall.

Materials

flash cards showing the words *first* to *ninth*
display board and cutouts (some for showing halves and fourths)
flash cards for the words *eleven* and *twelve*
counters and crayons for each child
unmarked metre sticks
counters such as transparent bingo chips
overhead projector
a straightedge for each child
number line showing only the multiples of five from 0 to 95
a set of 19 cards showing the multiples of five to 95 for each child
objects suitable for grouping by tens and by fives
paper shapes for folding in halves and fourths
objects suitable for sharing (apples, sandwiches, cookies)
number concept cards for 0 to 10 and cards showing the symbols +, -, and = for each child
objects for making sets, devices for set holders

Vocabulary

first	seventh
second	eighth
third	ninth
fourth	metre stick
fifth	one-fourth
sixth	fourths

Unit 11 Theme – At the Fair

The purpose of this theme is to conjure up for the children some of the excitement and anticipation generated by a fair and acquaint them with various aspects of the competitions, exhibits, foods, and rides at a fair.

Set up a display for a fair by arranging pictures of amusement rides, prize animals, crafts, and farm machinery as a background. Display several books that tell about fairs. Include the language charts and the children's work as each activity is completed.

LANGUAGE ACTIVITIES

1. The Amusement Centre

Read the following poem to the children.

MERRY-GO-ROUND

I climbed up on a merry-go-round,
And it went round and round.
I climbed up on a big brown horse
And it went up and down.
Around and around
And up and down,
Around and round
And up and down,
I sat up high
On a big brown horse
And rode around
On a merry-go-round
And rode around
On a merry-go-round
I rode around
On a merry-go-round
Around
And round
And
Round.

Dorothy Baruch

Discuss the rhythm and the words of the poem and then read the poem again with the children repeating the words in unison.

You may wish to print the poem on chart paper and display it where the children can read it on their own. Have the children try to find a picture of a merry-go-round to display with the poem.

Discuss other amusement rides that the children like to go on at a fair. Find out the names of their favorite rides and the attraction of each ride. Have the children suggest words that come to mind when they think of the rides. Record the words on a chart and encourage the children to refer to this chart when they are writing about other activities.

2. Foods at a Fair

Some foods such as hotdogs, hamburgers, popcorn, candy apples, and candy floss are associated with a fair. Discuss these foods with the children. List the items on a chart. Have the children suggest words that describe how each item tastes and smells. Record these words on the chart. Ask the children

to think of the sounds they hear as the food is cooking. The children should also use this chart as a reference when writing about other activities.

3. ABC's at a Fair

Write the letters from A to Z in a column on a chart. Have the children study the display for the fair and suggest for each letter one item that one might find at a fair. The items may be from such classifications as foods, farm produce, animals, rides, and games. The list might begin like this:

- A – apple cider
- B – bacon
- C – cakes

4. Role Playing

Record on activity cards several situations that might happen at a fair. Ask individual children to read the cards and to act out the situations silently. Have the other children try to guess what situation is being enacted. The following are some possible situations.

- eating a hotdog
- judging a cow (horse, pig, sheep)
- getting off the merry-go-round
- selling balloons
- judging entries in the homebaking competition
- trying out a new tractor

5. Emotional Display

The fair is usually not a time when people are sad. Ask the children to think of situations at a fair when a person might be happy, surprised, angry, excited, jealous, proud, disappointed, embarrassed, bored, or worried.

Have one or more puppets available. Ask children to demonstrate some of the situations suggested for the emotions listed above. For example, one puppet could portray a girl who was proud that her calf had won first prize; another puppet could portray a man who was worried because his horse became ill at the fair.

MATHEMATICS ACTIVITIES

1. Classifying

Have the children cut from magazines pictures of things found at a fair. Have them paste the pictures on charts labelled “Animals at the Fair” and “Foods at the Fair”.

2. Graphing

List five foods found at a fair and prepare several cutouts for each type of food. Have each child choose a cutout for her/his favorite food from the list. Use the cutouts to make a pictograph to show which food is liked by the greatest number of children.

A bar graph can be prepared to determine the favorite rides of the children.

3. The Calendar

Display a large calendar showing all the months. Mark the months of the year that are most suitable for holding a fair. Have the children give reasons why these are good months for a fair. Record the reasons on a chart.

4. Ring Toss

For this activity the children can pretend they are at a fair. The activity will also provide an enjoyable setting for practising addition facts.

Turn several chairs upside down with the legs tilted toward the players. To each leg of the chairs, attach a small card showing a numeral from 0 to 9.

Have children in turn stand at a predetermined distance from the chairs and try to throw jar rings over the legs of the chairs. Each player has three chances. Each score is the sum of the numbers on the legs that have been ringed. The player who has the highest score at the end of a given number of rounds is the winner.

5. Step Right Up

This is another activity for which the children may pretend they are at a fair while practising basic subtraction facts.

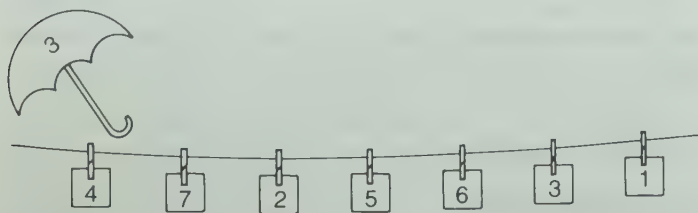
You will need a shallow box, twelve paper (plastic or Styrofoam) cups, and two small (ping-pong) balls. Place a numeral from 1 to 12 on the inside bottom of each cup. Glue all the cups to the inside bottom of the box so that the numbers are randomly placed. The first player stands at a predetermined distance from the array of cups and throws the two balls into the cups. The player finds the difference of the two numbers in the cups where the balls landed. The player (or players) with the greatest difference for that round scores one point. The game continues until one player reaches a score of ten points.

6. Going to the Fair

Prepare a colored paper balloon shape for each player. Each balloon should have a numeral from 0 to 9 on it. One child is chosen as the leader and stands at the front of the classroom. The leader says, "I am going to the fair." The other players ask, "Who is going to the fair with you?" The leader then chooses five of the players. These players join the leader at the front of the classroom with their balloons. The leader must add (subtract) her / his number to (from) each number in turn on the other players' balloons. If the leader fails to answer one of the five number combinations correctly, he / she forfeits the leadership to the player whose number stumped the leader.

7. Tightrope Walk

Stretch a piece of cord between the backs of two chairs. Use clothes pins to attach numeral cards for numbers to 9 to the "tightrope". Prepare an umbrella shape on which a single numeral can be written. Each "acrobat" will hold this umbrella shape to help her / him "balance" as she / he "walks the tightrope". For the tightrope shown below, the acrobat would state the sums of 4 and 3, 7 and 3, 2 and 3, and so on. If an incorrect sum is given, the acrobat "falls off" the tightrope and another acrobat tries to make a successful walk.



This activity may be adapted for subtraction or for stating whether numbers are greater than or less than the number shown on the umbrella.

SCIENCE ACTIVITIES

1. Competitions at a Fair

One of the highlights of a fair is the judging of entries in various categories. Choose areas of competition and have the children engage in related activities.

Judging Animals

- List animals that may be entered in the competitions.
- Make a list of things that the judges might look for when judging an animal (cow, horse, pig).
- Draw a picture of a prize animal (cow, horse, pig).

Judging Fruits and Vegetables

- Cut pictures of prize vegetables from magazines and catalogues.
- Discuss what the judges might be looking for when judging fruits and vegetables.
- Choose four kinds of apples. Judge them according to the rules decided upon in the preceding activity.

Judging Homebaking and Preserves

- List at least ten things that are baked.
- How do the judges decide which is the best item (pie, cake, bread)?
- Bake some prize-winning cookies.

SOCIAL STUDIES ACTIVITIES

1. People Who Work at a Fair

Many people are employed at a fair in different types of jobs. Most of the jobs are temporary, but some permanent employees travel from fair to fair with the rides and concessions. Help the children decide which jobs are temporary and which are permanent. Discuss some of the jobs and the duties involved as suggested below.

Ride Operators

- "What different jobs are associated with the rides?"
- "What other jobs does the operator have besides starting and stopping the ride?"
- "What special skills does a ride operator need?"

Judges

- "How many judges should there be to give a fair decision?"
- "What do you suppose judges do in their regular jobs?"
- "How would you choose someone to be a judge at a fair?"

Food Sellers

- "Does a person need to be a good cook to prepare food at a fair?"
- "What skills do people in the booths need besides that of preparing the food?"
- "Which foods can be made at home?"

2. Planning a Fair

In order to get the children fully involved in this theme, organize a fair in your classroom or on the school grounds. This will give your class a chance to plan, organize, and work together as a group. Perhaps other classes would like to become involved in this activity. This activity might also extend to include the whole community.

There will be many things to plan. For example, some decisions that will have to be made include where and when the fair will be held; whether there will be exhibits and, if so, what kinds; whether there will be games and, if so, what games;

whether there will be craft displays; who will be judges; what committees will be necessary.

In planning the fair, discuss what community services or organizations become involved in a fair; for example, what roles are played by such community or government organizations as the Department of Health, the Safety Commission, the St. John Ambulance.

The fair will need to be advertised. Have the children discuss what information must be included on a poster to advertise the fair.

Discuss the expenses involved in taking a family to a fair. Through discussion, examples, and illustrations, children may realize how expensive it is for a large family to attend a fair.

ART ACTIVITIES

1. Clowns on Parade

Try to obtain striped paper bags from specialty shops or department stores. When these are stuffed with shredded newspaper, they make ideal bodies for clowns. If such bags are not available, have the children use felt markers to draw vertical stripes on either white or brown paper bags. The children may trace their own hands and feet on construction paper, and then cut these out and staple or tape them to the bodies. Heads for the clowns can be made from paper plates that have been decorated with yarn for hair, buttons, Plasticine balls, and other odds and ends for facial features. When the clowns are completed, they may be placed on parade for other classes to enjoy.

2. An Animal Exhibit

At a fair, small animals such as hens, ducks, rabbits, cats, and dogs are placed in cages with bars to protect them and to keep them from escaping.

Ask the children to choose small animals that they would like to exhibit at the fair. Have each child draw a picture of the animal he/she chose and then mount the picture on a cardboard produce tray or a Styrofoam meat tray. Punch a row of evenly spaced holes at the top and the bottom of each tray. Have the children thread yarn through the holes, pull it taut, and fasten the ends at the back of the tray. Now the animal is safely behind "bars". Display the caged animals. If there are several animals of the same kind in the display, the children may wish to hold a contest and select the "Best of a Kind".

3. Shoebox Floats

Most children will have seen beautiful floats in a parade either live or on a television program. Arouse the children's interest in making their own personal floats by providing flat boxes, such as shoeboxes, to form foundations for the floats. Provide scraps of fabric, ribbon, tape, yarn, string, wood, buttons, gift-wrapping paper, and other odds and ends for the children to use in creating their floats. Encourage them to be as imaginative as possible. You may wish to award prizes for the best floats.

4. A Super Structure

Provide long strips of colored paper, each about 2 cm wide. Have the children paste these end to end to form even longer strips that can be twisted, looped, and curled to give a roller coaster appearance. These twisted loops can be glued to a paper base measuring about 30 cm by 50 cm. After the first layer of loops is glued into place, the structure can be built higher and higher by gluing a new layer to each previous layer.

Some children may wish to see how high they can make this "roller coaster".

5. A Mural

A fair is an ideal theme for a large mural. Divide the class into five groups. Have the groups make the following items from construction paper.

exhibits
food concessions
rides
competitions
people

Place the items on the mural in the way they would appear at a fair.

6. Tabletop Display

On a tabletop have the children build a scene that will depict events at a fair. They may make the shapes desired from modelling clay in various colors.

You may prefer to make a bread dough using four cups of unsifted flour, one cup of salt, and one and a half cups of water. (This recipe should not be halved or doubled.) Mix the salt and the flour in a large bowl. Add the water slowly, mix thoroughly, and knead the dough for ten minutes. After proper kneading the dough mixture should be soft and smooth. Powdered tempera paint can be used to color the dough.

After the children have formed their models, these should be baked in a preheated oven set at 160°-175°C, never hotter. Baking time will vary according to the consistency of the dough and the thickness of the model. It is best to allow one-half hour baking time for each 5 mm thickness of dough.

MOVEMENT ACTIVITIES

1. Ride Motions

Discuss the motions of the rides with the children, the speeds at which the different rides move, and the directions in which they move. Have the children move in the ways suggested by the rides.

2. Dance a Story

Tell a story of children visiting a fair and the activities in which they participate. Discuss the movements involved in the story. Tell the story again and have the children act it out through creative movement.

3. Balloon Ball

Choose a starting line and a finishing line on the floor of the gym. Give each player a balloon of a different color or that is identifiable in some way. The players must propel their balloons from the starting line to the finishing line by patting them with their hands or kicking them with their feet. Players must not hold the balloons or run with them. The player who first sends her/his balloon across the finishing line is the winner.

MUSIC ACTIVITIES

1. Listening to Music

Many of the rides at a fair have music associated with them. Discuss with the children why there is music and what kind of music is used. If possible, play samples of calliope music or the types used on merry-go-rounds. The overture to the musical "Carousel" is suitable music.

Unit 11



LESSON OUTCOME

Demonstrate an understanding of the ordinal number concepts to *ninth*; recognize the ordinal number names *first* to *ninth*

Materials

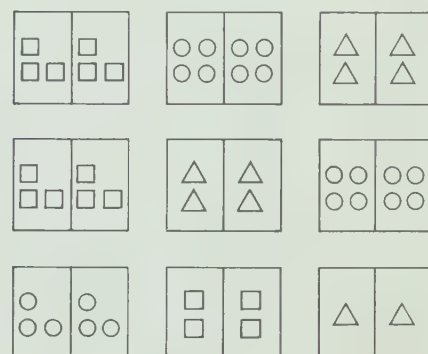
flash cards for the words *first* to *ninth*

Vocabulary

first, second, third, fourth, fifth, sixth, seventh, eighth, ninth

RELATED ACTIVITIES

- Prepare a set of nine cards having patterns based on color and shape. On six of the cards, make identical patterns in pairs so that there are three different patterns. Make the pairs of patterns on the remaining three cards all different. Mix the cards, place them in a row, and have children identify, in turn, pairs of cards that are identical, for example, the second and the sixth. Ask the children to tell in what way pairs of cards are different.



LESSON ACTIVITY

Before Using the Page

- In earlier units the children were expected to understand the meaning of the words *first*, *second*, *third*, *fourth*, and *fifth*. Now more formal work with the ordinal number concepts to *ninth* is introduced.

If possible, organize races in the gym or in the schoolyard to help recall the meaning of the words *first*, *second*, *third*, *fourth*, and *fifth*.

- Read the poem on page T303. As you read the words *first*, *second*, *third*, *fourth*, and *fifth*, hold up the corresponding flash card and ask the children to read the word. Have children dramatize the poem and then illustrate it. Have them print the words *first* to *fifth* under the appropriate chicken.
- Ask nine children to stand in a row. Ask another child to count the children in order from one to nine. Have the children in the row in turn say, "I am first," "I am second," and so on. Give a flash card to each of nine other children and have them give the appropriate card to each child in the row.

- Have the children make a chart showing pictures of nine children in a row. Have them fasten labels for *first* to *ninth* on the appropriate children.

Using the Page

- Discuss the picture with the children. Establish that the beginning of the line of children is at the ticket booth. Ask questions similar to the following to reinforce the understanding and use of the ordinal number concepts *first* to *ninth*:

"Which child is first in line to buy tickets?"
 "Which child has a red balloon?"
 "Which child has a blue balloon?"
 "Which child has a red cap?"
 "Which child is wearing yellow shorts?"
 "Which child is eighth in line?"
 "Which child is the tallest?"
 "Which child has a red dress?"
 "Which boy is wearing red shorts?"

LESSON OUTCOME

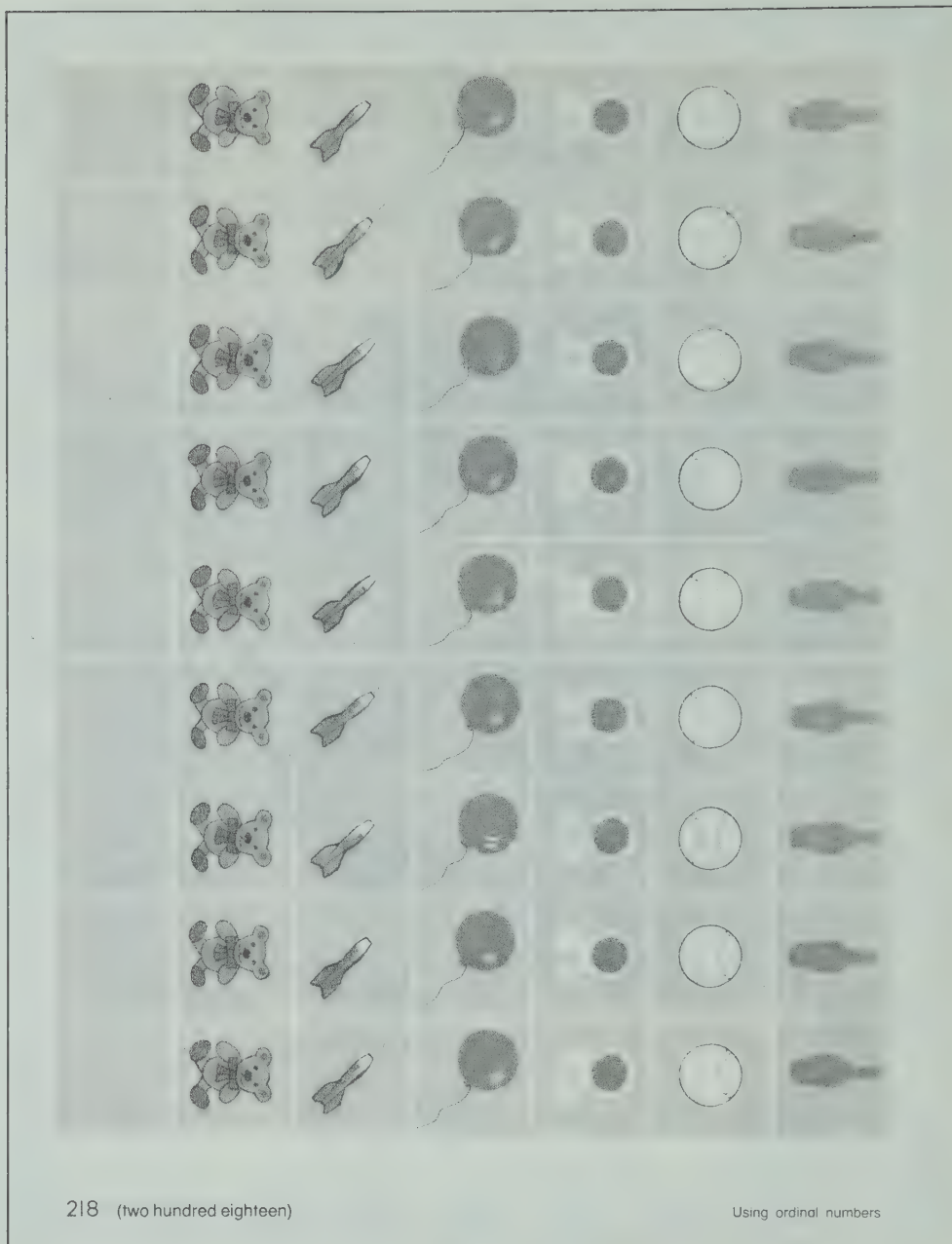
Use ordinal number names to *ninth*

Materials

flash cards for the words *first* to *ninth*

RELATED ACTIVITIES

- Print the words from *one* to *nine* in a column on the chalkboard. Print the words from *first* to *ninth* in a column beside the first column. Have the children study the number names in the two columns and note which names are nearly the same (*four* and *fourth*, *five* and *fifth*, and so on) and which names are quite different (*one* and *first*, *two* and *second*). Avoid using the words *cardinal* and *ordinal* with the children.
- Make a copy of page T341 for each child. Ask the children to place the paper so that the nine squares will be across the top. Have the children color squares according to a particular pattern.



218 (two hundred eighteen)

Using ordinal numbers

LESSON ACTIVITY

Before Using the Page

- Place nine books of different colors in a row. Ask the color of the first book in the row. Have a child select the appropriate flash card and place it in front of the book. Ask the color of the fourth book in the row. Have a child select the appropriate card and place it in front of the book. Have a child select another card, read the word, and place the card in front of the appropriate book. Continue this activity until a card has been placed in front of each book.
- Ask nine children to stand in a row. Ask the second and fourth children to change places. Then ask the third and sixth children to change places. Continue this activity until all the children have moved several times.

Using the Page

- Ask the children to turn the page sideways so that they can work from left to right for each row. The page has been designed so that the children will have to follow instructions.

Some of the instructions might be as follows:

- “Mark an X on the third bowling pin.”
- “Color the first ball yellow.”
- “Color the sixth ball red.”
- “Color the eighth ball blue.”
- “Color the ninth ball brown.”
- “Use a \checkmark to show the seventh award ribbon.”
- “Ring the fourth balloon.”
- “Draw a line under the fifth dart.”
- “Draw a ring around the second teddy bear.”

Have the children print, if possible, the words *first* to *ninth* under the balloons.

Have the children follow your instructions for drawing things in the last row, for example, a ball on the third shape and an apple on the sixth shape.

LESSON OUTCOME

Complete addition facts for sums of 11

Materials

display board and cutouts, flash card for the word *eleven*, eleven counters for each child

RELATED ACTIVITIES

- Play the game "How Many More?" with the children. Say, "I have five. How many more make eleven?" Let the children use their counters to find the answer. The child who first answers correctly can ask the next question.

Complete. $10 + 1 = \text{eleven}$

$9 + 2 = 11$ $8 + 3 = 11$

$7 + 4 = 11$ $6 + 5 = 11$

$5 + 6 = 11$ $4 + 7 = 11$

$3 + 8 = 11$ $2 + 9 = 11$

$\begin{array}{r} 9 \\ + 2 \\ \hline 11 \end{array}$	$\begin{array}{r} 2 \\ + 9 \\ \hline 11 \end{array}$	$\begin{array}{r} 8 \\ + 3 \\ \hline 11 \end{array}$	$\begin{array}{r} 3 \\ + 8 \\ \hline 11 \end{array}$	$\begin{array}{r} 10 \\ + 1 \\ \hline 11 \end{array}$
$\begin{array}{r} 7 \\ + 4 \\ \hline 11 \end{array}$	$\begin{array}{r} 4 \\ + 7 \\ \hline 11 \end{array}$	$\begin{array}{r} 6 \\ + 5 \\ \hline 11 \end{array}$	$\begin{array}{r} 5 \\ + 6 \\ \hline 11 \end{array}$	$\begin{array}{r} 1 \\ + 10 \\ \hline 11 \end{array}$

Addition facts, sums of 11 (two hundred nineteen) 219

LESSON ACTIVITY

Before Using the Page

- Display a set of five cutouts and another set of five cutouts. Ask how many there are. Include one more cutout and ask how many there are.

Hold up a flash card for the word *eleven* and ask if someone knows the word. You may wish to have several children print the word on the chalkboard. Ask a child to print the numeral 11 on the chalkboard.

- Give each child eleven counters. Ask the children to separate the counters into ten and one more. Write $10 + 1 = 11$ on the chalkboard. Have the children move counters from one group to the other to give another combination for 11. For each combination suggested, write the corresponding addition sentence on the chalkboard. Then have children rewrite the number sentences in sequence to show that when the number for one group is one less, the number for the other group is one greater.

$$\boxed{10} + \triangle = 11 \quad \boxed{9} + \triangle = 11 \quad \boxed{8} + \triangle = 11$$

Using the Page

- Direct the children's attention to the bowling pins at the top of the page. Ask how many bowling pins there are in the first group and how many bowling pins there are in the second group. Ask how many bowling pins there are altogether. Have the children trace over the dotted 11 and read the addition sentence. Have them read the word "eleven".
- For the first part of the page, discuss the first example with the children and have them trace over the dotted numerals. Then let the children work independently.
- For the second part of the page, the children may refer to the exercises on the first part of the page, or they may use the pictures of the bowling pins, or they may prefer to use their own counters for assistance. Note that the exercises present an opportunity to review that the order of adding two numbers does not change the sum.

LESSON OUTCOME

Complete subtraction facts for minuends of 11

Materials

display boards and cutouts, eleven counters for each child

RELATED ACTIVITIES

- Have the children make a chart as shown to illustrate addition and subtraction facts having sums and minuends of 11.

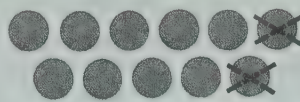


$$\begin{array}{l} 9 + 2 = \underline{\quad} \\ 8 + 3 = \underline{\quad} \\ 7 + 4 = \underline{\quad} \\ 6 + 5 = \underline{\quad} \\ 11 - 2 = \underline{\quad} \\ 11 - 3 = \underline{\quad} \\ 11 - 4 = \underline{\quad} \\ 11 - 5 = \underline{\quad} \end{array}$$

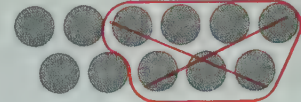
Have the children write four pairs of addition and subtraction sentences. Then have them turn the chart around and write four more pairs of addition and subtraction sentences.

- Play "The Losing Game" with the children. Say, "I had eleven. Now I have seven. How many did I lose?" The child who first answers correctly can ask the next question.

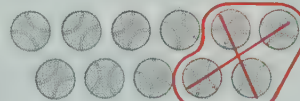
Complete.



$$11 - 2 = \underline{9}$$



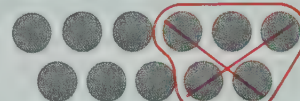
$$11 - 7 = \underline{4}$$



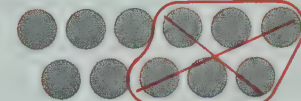
$$11 - 4 = \underline{7}$$



$$11 - 9 = \underline{2}$$



$$11 - 5 = \underline{6}$$



$$11 - 6 = \underline{5}$$



$$11 - 3 = \underline{8}$$



$$11 - 8 = \underline{3}$$

$$\begin{array}{r} 11 \\ - 2 \\ \hline 9 \end{array} \quad \begin{array}{r} 11 \\ - 9 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 11 \\ - 3 \\ \hline 8 \end{array} \quad \begin{array}{r} 11 \\ - 8 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 11 \\ - 1 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 11 \\ - 4 \\ \hline 7 \end{array} \quad \begin{array}{r} 11 \\ - 7 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 11 \\ - 5 \\ \hline 6 \end{array} \quad \begin{array}{r} 11 \\ - 6 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 11 \\ - 10 \\ \hline 1 \end{array}$$

220 (two hundred twenty)

Subtraction facts, minuends of 11

LESSON ACTIVITY

Before Using the Page

- Ask a child to display ten cutouts on the display board as the other children count from one to ten. Display one more cutout and ask how many there are now. Write $10 + 1 = 11$ on the chalkboard. Remove the one cutout and ask how many are left. Develop that the action suggests subtraction, and write $11 - 1 = 10$ on the chalkboard.

Start with eleven cutouts again and have children remove some of them. Repeat several times. For each example, have children state the corresponding subtraction sentence.

- Give each child eleven counters. Have them separate some counters from the set and suggest the corresponding subtraction sentence. Have a child write each subtraction sentence on the chalkboard. Then have the children rewrite the number sentences in sequence to show that when the number being subtracted is one more, the number for the answer is one less.

$$11 - \triangle 1 = \square 10 \quad 11 - \triangle 2 = \square 9 \quad 11 - \triangle 3 = \square 8$$

Using the Page

- Discuss the first exercise with the children. Ask how many balls there are in the first set, how many of the balls are crossed out, and how many balls are not crossed out. Have the children trace over the dotted 9. For the second exercise, ask how many balls there are. Then ask how many of the balls they should cross out. Have the children draw a ring around seven balls and then draw a large X inside it. Then ask how many balls are not crossed out. Have the children print the numeral 4 to complete the subtraction sentence. Have the children complete the remaining six exercises independently.
- For the second part of the page, the children may refer to the exercises on the first part of the page, or they may use their counters for assistance.

LESSON OUTCOME

Recognize a length of one metre

Materials

unmarked metre sticks, a piece of paper for each child

Vocabulary

metre stick

RELATED ACTIVITIES

- Ask a child whose height is approximately one metre to lie on a large sheet of paper. Have children trace around the child, cut out the outline, and paste it on a cardboard backing to make a stand-up model. The children may enjoy giving it a name containing the word "metre".
- Have the children make a "Metre Book". Ask each child to make a drawing of something he / she measured that is about one metre stick long. Have the children paste the drawings in the book and print the names below them.

**LESSON ACTIVITY****Before Using the Page**

• Tell the children to pretend that they are going to cut a piece of paper to cover the top of their desk and that it must fit exactly. Discuss how the size of the paper can be found. Give each child a small piece of paper having proportions similar to their desks. Have them use a span as a non-standard unit to measure the length of their desks. Have them record the number of spans on the longest side of the piece of paper. Then have the children measure the width of their desks and record the number of spans. Record each pair of measurements on the chalkboard as each child reports her/his findings. Lead a discussion that will make the children aware that even though all their desks are of the same size, all their measurements are not the same because their spans are of different lengths. (The measurements are not wrong, only different.) Lead the children to realize that a unit that is the same size (standard unit) is needed for all the measurements to be the same.

- Display an unmarked stick that is one metre long. Tell the children that it is to be called a *metre stick* and that they will use it for measuring. Ask the tallest child to come and stand beside the metre stick. Ask if the child is taller than or shorter than a metre stick. Ask the shortest child to stand beside the metre stick. Repeat the question. Try to find a child who is exactly one metre stick tall.
- Hold the metre stick horizontally and ask children to spread their arms apart so that the tips of their fingers are one metre stick apart. Take the metre stick away and have them practise estimating when their hands are one metre stick apart.
- Have the children use metre sticks for measuring lengths in the gym.

Using the Page

- Discuss the activities of the children in the picture. Ask children to name things in the picture that could be measured and then to decide whether they are longer than a metre stick, shorter than a metre stick, or about the same length as a metre stick.

LESSON OUTCOME

Measure using the metre as a unit of length

Materials

unmarked metre sticks, sheets of paper

RELATED ACTIVITIES

- Have children measure such things as the height of a door, the width of a door, and so on. After children have had practice measuring distances in the classroom, they will be eager to measure longer distances outside the classroom. You may wish to take the children outside the school to measure objects and distances.
- Make a chart of pictures of things that are about the same length as a metre stick. You may also wish to make charts showing things that are longer than a metre stick and things that are shorter than a metre stick.
- See the activities suggested on page T287.

Use a metre stick.



longer than

a metre stick

shorter than



longer than

a metre stick

shorter than



longer than

a metre stick

shorter than



longer than

a metre stick

shorter than



longer than

a metre stick

shorter than



longer than

a metre stick

shorter than

How far is it

Answers will vary.

to the next classroom?

about _____ metre sticks

to the library?

about _____ metre sticks

to the office?

about _____ metre sticks

across the classroom?

about _____ metre sticks

around the classroom?

about _____ metre sticks

down the hall?

about _____ metre sticks

to the gym?

about _____ metre sticks

LESSON ACTIVITY

Before Using the Page

- Display a metre stick. Ask children to come to the chalkboard and spread their arms for what they estimate to be a distance of one metre stick. Make a chalk mark at the ends of the fingers of each hand. Repeat until a number of children have had a turn. Then hold a metre stick beside the marks for each child. Ask children to state whether each estimate is longer than a metre stick, shorter than a metre stick, or about the same length as a metre stick.
- Have children help you measure the length of the chalkboard. Place one end of the metre stick at one end of the chalkboard and hold it while one child makes a mark at the other end of the metre stick. Have two children move the metre stick, place one end at the chalk mark, and make a mark at the other end of the metre stick. Continue until there is less than one metre to measure. Have children count how many times the metre stick was placed. Ask if the chalkboard is longer than _____ metre sticks or if it is shorter than _____ metre sticks.

Have children state, "The chalkboard is about _____ metre sticks long."

Using the Page

- Direct the children's attention to the instruction at the top of the page. Discuss with the children that they are to measure the length of a child's belt, the length of a bulletin board, the height of a chair, the width of five books on a shelf, the height of a door, and the length of a dog's leash. Read the words with the children to ensure that they recognize "longer than" and "shorter than". Then have the children work in small groups and take turns using the metre stick.
- For the second part of the page, have the children work in small groups and take turns measuring and recording the number of metre sticks. Each group should have one unmarked metre stick, a piece of paper, and a pencil for recording the information. If the distances mentioned on the page are not practical for your class, you may wish to prepare a list of other distances for the children to measure.

LESSON OUTCOME

Complete addition facts for sums of 12

Materials

display board and cutouts, flash card for the word *twelve*, twelve counters for each child

RELATED ACTIVITIES

- The game "How Many More?" described on page T285 may be played for the number *twelve*.
- Display an empty egg carton and ask how many eggs can be placed in the carton. Place four "white eggs" in the carton. Have children find how many "brown eggs" are needed to fill the carton and state, "Four and eight are twelve." Ask a child to place "white eggs" in the carton and ask other children to determine how many "brown eggs" are needed to make twelve. You may wish to introduce the word *dozen* at this time.


 $10 + 2 = 12$
 twelve

Complete.

$9 + 3 = 12$	$8 + 4 = 12$
$7 + 5 = 12$	$6 + 6 = 12$
$5 + 7 = 12$	$4 + 8 = 12$
$3 + 9 = 12$	$2 + 10 = 12$

$\begin{array}{r} 9 \\ + 3 \\ \hline 12 \end{array}$	$\begin{array}{r} 3 \\ + 9 \\ \hline 12 \end{array}$	$\begin{array}{r} 8 \\ + 4 \\ \hline 12 \end{array}$	$\begin{array}{r} 4 \\ + 8 \\ \hline 12 \end{array}$	$\begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array}$
$\begin{array}{r} 7 \\ + 5 \\ \hline 12 \end{array}$	$\begin{array}{r} 5 \\ + 7 \\ \hline 12 \end{array}$	$\begin{array}{r} 10 \\ + 2 \\ \hline 12 \end{array}$	$\begin{array}{r} 2 \\ + 10 \\ \hline 12 \end{array}$	

Addition facts, sums of 12 (two hundred twenty-three) 223

LESSON ACTIVITY

Before Using the Page

- Display a set of five cutouts and another set of five cutouts. Ask how many there are. Include one more and ask how many there are. Include one more and again ask how many there are.

Hold up a flash card for the word *twelve* and ask if someone knows the word. You may wish to have several children print the word on the chalkboard. Ask a child to print the numeral 12 on the chalkboard.

- Give each child twelve counters. Ask the children to separate them into ten and two more. Write $10 + 2 = 12$ on the chalkboard. Have the children move counters from one group to the other to give another combination for 12. For each combination suggested, write the corresponding addition sentence on the chalkboard. Have children rewrite the number sentences in sequence to show that when the number for one group is one less, the number for the other group is one greater.

$$\boxed{10} + \triangle 2 = 12 \quad \boxed{9} + \triangle 3 = 12 \quad \boxed{8} + \triangle 4 = 12$$

Using the Page

- Direct the children's attention to the horseshoes at the top of the page. Ask how many horseshoes there are in the first group and how many horseshoes there are in the second group. Ask how many horseshoes there are altogether and have the children trace over the dotted 12. Have children read the addition sentence and the word *twelve*.

Discuss the two groups of "rods" in the same way as for the horseshoes. Have the children trace over the dotted 9 and the dotted 3. Then let the children continue on their own.

- For the second part of the page, the children may refer to the exercises on the first part of the page, or they may use the pictures of the horseshoes, or they may prefer to use their own counters for assistance.

LESSON OUTCOME

Complete subtraction facts for minuends of 12

Materials

display board and cutouts, twelve counters for each child

RELATED ACTIVITIES

- “The Losing Game” described on page T286 may be played for the number 12.
- Have the children make a chart as shown to illustrate addition and subtraction facts having sums and minuends of 12.



$$\begin{array}{l} 9 + 3 = \underline{\quad} \\ 8 + 4 = \underline{\quad} \\ 7 + 5 = \underline{\quad} \\ 6 + 6 = \underline{\quad} \\ 12 - 3 = \underline{\quad} \\ 12 - 4 = \underline{\quad} \\ 12 - 5 = \underline{\quad} \\ 12 - 6 = \underline{\quad} \end{array}$$

Have the children write four pairs of addition and subtraction sentences. Then have them turn the chart around and write *three* more pairs of sentences. (They do not need to repeat sentences for 6 and 6.)

Complete.



$$12 - 5 = \underline{7}$$



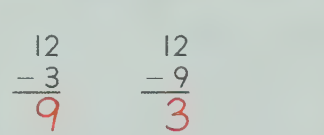
$$12 - 3 = \underline{9}$$



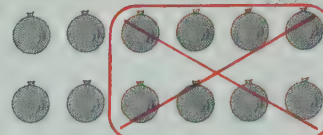
$$12 - 7 = \underline{5}$$



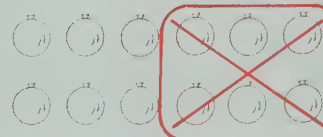
$$12 - 4 = \underline{8}$$



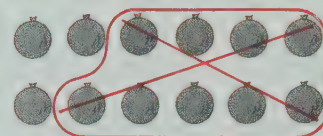
$$\begin{array}{r} 12 \\ - 3 \\ \hline 9 \end{array}$$



$$12 - 8 = \underline{4}$$



$$12 - 6 = \underline{6}$$



$$12 - 9 = \underline{3}$$



$$12 - 2 = \underline{10}$$



$$\begin{array}{r} 12 \\ - 5 \\ \hline 7 \end{array}$$

224 (two hundred twenty-four)

Subtraction facts, minuends of 12

LESSON ACTIVITY

Before Using the Page

- Ask a child to place ten cutouts on the display board as the other children count from one to ten. Display one more cutout and ask how many there are now. Display one more cutout and repeat the question. Separate the cutouts into a group of ten and a group of two. Review that ten and two more are twelve. Write the addition sentence $10 + 2 = 12$ on the chalkboard. Then remove the two cutouts and ask how many cutouts are left. Develop that the action suggests subtraction, and write $12 - 2 = 10$ on the chalkboard.

Start with twelve cutouts again and have children remove some of them. Repeat several times. For each example, have children state the corresponding subtraction sentence.

- Give each child twelve counters. Have them separate some counters from the set and suggest the corresponding subtraction sentence. Have a child write each subtraction sentence on the chalkboard. Then have the children rewrite the number

sentences in sequence to show that when the number being subtracted is one more, the number for the answer is one less.

$$12 - \triangle 2 = \square 10 \quad 12 - \triangle 3 = \square 9 \quad 12 - \triangle 4 = \square 8$$

Using the Page

- Discuss the first exercise with the children. Ask how many green balloons there are, how many of the balloons are crossed out, and how many balloons are not crossed out. Have the children trace over the dotted 7. For the second exercise, ask how many brown balloons there are. Then ask how many of the balloons they should cross out. Have the children draw a ring around eight balloons and then draw a large X inside it. Then ask how many balloons are not crossed out. Have the children print the numeral 4 to complete the subtraction sentence. Have the children complete the remaining six exercises independently.
- For the second part of the page, the children may refer to the exercises on the first part of the page, or they may use their counters for assistance.

OBJECTIVE

Complete basic addition and subtraction facts, sums and minuends of 10, 11, and 12

Materials

counters such as transparent bingo chips, overhead projector, twelve counters for each child, a straightedge for each child

RELATED ACTIVITIES

- Have the children make a page showing the related facts having sums of 11 and a page showing the related facts having sums of 12 for their "Book of Facts". (See page T261.)
- Have the children make a chart of number sentences with sums of 11 and 12 using three addends, for example, $0 + 1 + 10 = 11$, $1 + 1 + 9 = 11$, $1 + 2 + 8 = 11$, and so on. If some children are very keen, let them use more than three addends.
- The activities using the twelve-point geoboard described on page T303 can be used to reinforce related facts for sums to 12.

Complete.

$8 + 3 = 11$

$7 + 5 = 12$

$$\begin{array}{r} 8 \\ + 4 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 6 \\ + 5 \\ \hline 11 \end{array}$$

$4 + 7 = 11$

$11 - 2 = 9$

$$\begin{array}{r} 11 \\ - 3 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 9 \\ + 2 \\ \hline 11 \end{array}$$

$10 - 3 = 7$

$5 + 5 = 10$

$$\begin{array}{r} 11 \\ - 3 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 11 \\ + 2 \\ \hline 13 \end{array}$$

$11 - 5 = 6$

$11 - 6 = 5$

$$\begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 11 \\ - 8 \\ \hline 3 \end{array}$$

$4 + 8 = 12$

$2 + 9 = 11$

$$\begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 11 \\ - 8 \\ \hline 3 \end{array}$$

$5 + 6 = 11$

$12 - 5 = 7$

$$\begin{array}{r} 12 \\ - 5 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 7 \\ + 4 \\ \hline 11 \end{array}$$

$10 - 4 = 6$

$11 - 4 = 7$

$$\begin{array}{r} 9 \\ + 3 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 7 \\ + 4 \\ \hline 11 \end{array}$$

$12 - 2 = 10$

$12 - 6 = 6$

$$\begin{array}{r} 12 \\ - 6 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 11 \\ + 8 \\ \hline 19 \end{array}$$

$11 + 0 = 11$

$6 + 5 = 11$

$$\begin{array}{r} 12 \\ - 7 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 3 \\ + 8 \\ \hline 11 \end{array}$$

$11 - 9 = 2$

$7 + 3 = 10$

$$\begin{array}{r} 12 \\ - 7 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 11 \\ + 8 \\ \hline 19 \end{array}$$

$5 + 7 = 12$

$3 + 9 = 12$

$$\begin{array}{r} 11 \\ - 4 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 5 \\ + 7 \\ \hline 12 \end{array}$$

$12 - 8 = 4$

$11 - 1 = 10$

$$\begin{array}{r} 11 \\ - 4 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 5 \\ + 7 \\ \hline 12 \end{array}$$

$4 + 6 = 10$

$11 - 7 = 4$

$$\begin{array}{r} 12 \\ - 6 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 12 \\ - 4 \\ \hline 8 \end{array}$$

$6 + 6 = 12$

$12 - 9 = 3$

$$\begin{array}{r} 12 \\ - 6 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 12 \\ - 4 \\ \hline 8 \end{array}$$

$12 - 3 = 9$

$7 + 4 = 11$

$$\begin{array}{r} 12 \\ - 6 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 12 \\ - 4 \\ \hline 8 \end{array}$$

Addition and subtraction practice: sums and minuends of 10, 11, and 12

(two hundred twenty-five) 225

LESSON ACTIVITY

Before Using the Page

- Use counters such as transparent bingo chips on the overhead projector. Ask a child to place ten counters on the overhead projector. Display one more counter, ask how many there are in all, and ask for the addition sentence ($10 + 1 = 11$). Then remove the one counter and ask what number sentence describes the situation ($11 - 1 = 10$). Ask children to write the two related sentences on the chalkboard. Repeat the procedure for other combinations for eleven. Vary the procedure from time to time by starting with eleven counters, removing four, for example, and then returning the four counters to complete the set of eleven. This order presents the subtractive action first and the additive action second. For each example, emphasize that the second action "undoes" the effect of the first action.
- Have the children use counters to illustrate related sentences for sums of 12 and then for sums of 10. You may demonstrate

the process using the overhead projector as the children work at their desks.

Using the Page

- Discuss with the children how they are to proceed on the page and then let them work independently. Provide counters for the children who need them. Children who wish to check their work may enjoy using the teddy bears and the rag dolls as counters.
- After the children have completed the page, you may wish to challenge them to see how many pairs of related addition and / or subtraction facts they can find among the number sentences; for example, $11 - 5 = 6$ and $11 - 6 = 5$, $10 - 3 = 7$ and $7 + 3 = 10$, $5 + 7 = 12$ and $12 - 5 = 7$.
- You may wish to make up story problems about the teddy bears and the rag dolls shown on the page.
 1. There were seven teddy bears on a shelf. I put three more on the shelf. How many teddy bears were then on the shelf?
 2. There were twelve rag dolls on a shelf. I took away four of them. How many rag dolls were left on the shelf?

LESSON OUTCOME

Count by fives

Materials

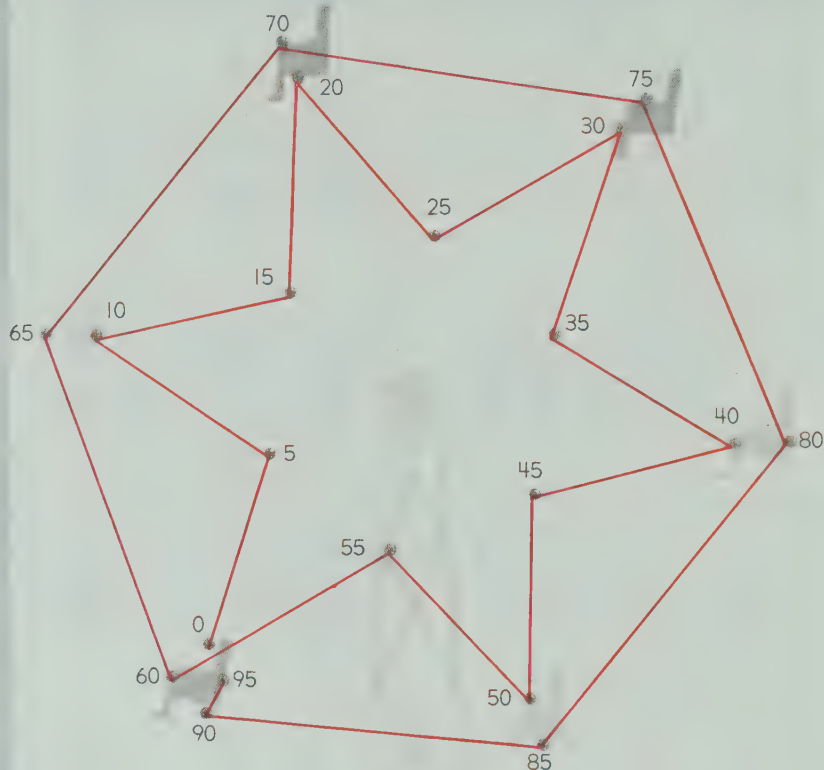
number line, 19 cards showing the multiples of five to 95, straightedge for each child (optional)

RELATED ACTIVITIES

- You may wish to use one or more of the games suggested in *Before Using the Page*.
- Have the children play the game "Car Rally" described on page T277, but have them use a die marked 5, 10, 15, 20, 25, 30. If you wish to provide practice with multiples of five greater than 30, have the children use a number spinner similar to the one shown below, in place of a die.



Join the dots.



226 (two hundred twenty-six)

Counting by fives

LESSON ACTIVITY

Before Using the Page

- Display a number line that shows only the multiples of five from 0 to 95. Have children say the numbers in order.
- Start at 50 and have the children count backward by fives. Cover one of the numerals and have a child state which one has been covered. Repeat several times.
- Play the game "I am Thinking of a Number" with the children. Say, "I am thinking of a number that is five greater than 30. What is the number?" Repeat several times and then change to "I am thinking of a number that is five less than 20. What is the number?" Repeat several times and then have children take turns asking the questions.
- Play the game "Hands Up" with the children. Ask them in turn to count by ones starting at one. When a child comes to a multiple of five, he / she names the number and raises a hand to show that the number is recognized as a multiple of five. Any child who fails to raise a hand for a multiple of five withdraws from the game.

- Give each of 19 children a card showing one of the multiples of five. Ask the children to separate themselves into two teams – one team consisting of those children having cards that show numbers less than 50 and the other team consisting of those children having cards that show numbers greater than 50. Ask the members of the teams to go to opposite sides of the classroom. Ask the child with the card showing 50 to stand halfway between the two teams. Have the members of each team arrange themselves on either side of "50", according to the numbers they represent.

Using the Page

- Read the instruction at the top of the page to the children. Ask the children to find the dot from which they are to start. Then have them join the dots in order from 0 to 95. Because the children were introduced to the concept of a line segment in the previous unit, you may wish to review the concept at this time, and have the children use a straightedge to join pairs of dots. After the children have joined the dots in order, ask children to read the numbers, in turn, while others check that their work is correct.

LESSON OUTCOME

Determine the numbers represented by one or more groups of five, to 9 fives

Materials

objects for grouping by fives, a set of cards showing the multiples of five from 5 to 95 for each child

RELATED ACTIVITIES

- Give each child a sheet of paper. Have the children draw around one of their hands, cut them out, and color them. Paste the hands in a row on a chart and write the numerals 5 to 95 below the hands.

Have the children refer to the chart and answer the following questions:

“How many fingers are there on two hands?”

“How many fingers are there on five hands?”

“How many are four fives?”

“How many are eight fives?”

“How many more fingers are there on four hands than on three hands?”

“If there are three hands and one hand is taken away, how many fingers are left?”

2 fives are 10 3 fives are 15 1 five is 5

5 fives are 25 7 fives are 35

Complete.

A	15		B	20		
		C	30		D	40
E	25		F	45		
		G	40		H	60
I	10		J	35		
		K	25		L	50

A 3 fives E 20 + 5
B 4 fives F 40 + 5
C 6 fives G 35 + 5
D 8 fives H 55 + 5
I 2 fives
J 7 fives
K 5 fives
L 9 fives + 1 five

Working with fives (two hundred twenty-seven) 227

LESSON ACTIVITY

Before Using the Page

- Ask ten children to stand in a row and ask each child to hold up one hand. Ask another child to count the fingers one by one on the first child's hand and write 5 on the chalkboard. Ask another child to begin with *six* and count the fingers on the hand of the second child. Ask how many there are. Have a child print 10 on the chalkboard. Say, “How many are two fives?” Continue counting the fingers on the hands of the other children, writing the numerals on the chalkboard, and asking “How many are _____ fives?”

Ask children to count the fingers again, but this time the counting is to be by fives rather than by ones. Elicit from the children that the fingers can be counted more quickly when counting by fives than by ones.

- Have the children group objects by fives. Place ten groups in a row and have children count by fives. Then have the children count by fives without starting at 5, for example, start at 25 and name the next four multiples of five. Repeat several times.

- Have each child make a set of cards showing the multiples of five from 5 to 95. Ask the children to arrange them from least to greatest on their desks. Write $10 + 5$ on the chalkboard. Have each child choose and hold up the card that shows the number represented (15). Repeat for $20 + 5$, $40 + 5$, and $70 + 5$. Then continue with such number phrases as $15 + 5$, $25 + 5$, and $75 + 5$.

Using the Page

- For the first part of the page, discuss with the children that they are to show how many groups of five there are and how many fingers there are in all.

- Discuss the number puzzle with the children, emphasizing that a two-place numeral is to be printed for each of A to L. Ask what number is named by “3 fives”. Have the children trace over the dotted 15. Ask what number is named by “4 fives”. Have the children print “20” for B. Then ask what number is named by $20 + 5$. Have the children print “25” for E. When the children understand what they are to do, let them continue on their own.

LESSON OUTCOME

Demonstrate an understanding of one-half of a whole and one-half of a set

Materials

shapes for folding, straightedges, display board and cutouts, twelve counters for each child, crayons for each child

RELATED ACTIVITIES

- After the children have completed the page, you may wish to have them identify which of the nine drawings for the first part of the page can be marked into halves in more than one way.
- Prepare work sheets showing sets of objects. Have the children color one-half of each of the sets.

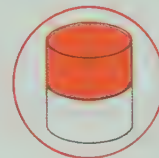
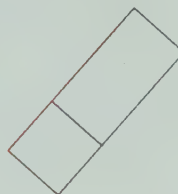
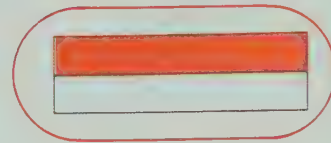
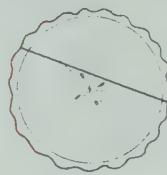
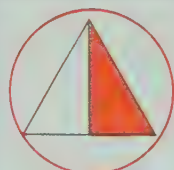
Instructions might be similar to the following:

- “Color half of the apples red.”
- “Color half of the hot dogs brown.”
- “Color half of the spots on the dog black.”

- You may wish to have the children pour water, rice, or sand into containers having vertical sides to show when they are half full.

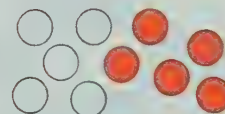
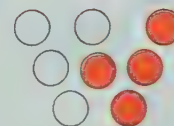
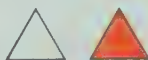
- Have the children write the addition sentences in which each addend is half the sum ($1 + 1 = 2$, $2 + 2 = 4$, ..., $6 + 6 = 12$).

Ring, and color one half.



Ring those that show one-half and color one half

Color one half of each set.



Answers may vary.

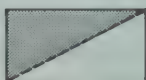
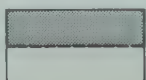
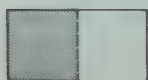
228 (two hundred twenty-eight)

Reviewing the concept one-half

LESSON ACTIVITY

Before Using the Page

- From paper, cut squares, rectangles, and other shapes that can be folded in half. Have children fold these in half, cut along the fold line, and check that the two halves are identical. Note that to make one piece fit exactly over the other piece it may need to be turned around.
- Have children use the halves of the rectangles they obtained above to show how a rectangle can be cut into two parts having the same size. If the four possible ways were not obtained by cutting in the first activity, provide more rectangles and have children discover the remaining ways of cutting a rectangle into two equal parts. To make it easier to obtain the diagonal fold lines for the rectangles, have the children use a straightedge to draw the lines and then make the fold.



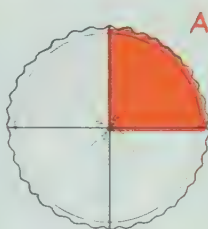
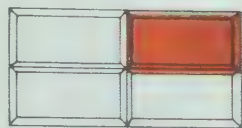
You may wish to have the children color one of each of the two equal parts to emphasize the position of the fold line. Repeat the activity using a square and also a triangle with two equal sides.

- Place shapes that have been cut in half on the display board. Have children find the other half of a given shape.
- Give each child twelve counters. Have them select eight counters, pretend to share them with another person, and state how many each person would get. Repeat for other even numbers of counters.

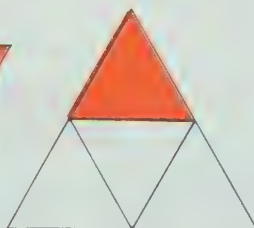
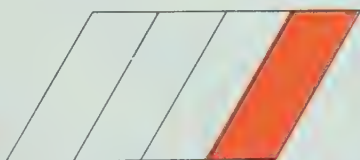
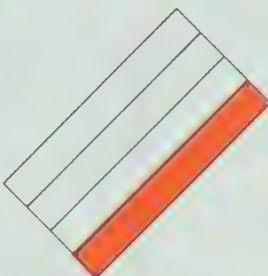
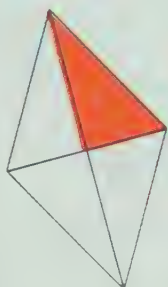
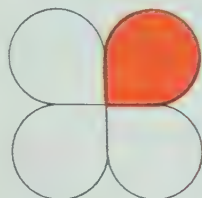
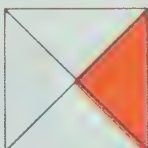
Using the Page

- Read the first instruction to the children. Tell them that they are to ring only the drawings that are marked into two equal parts. Then they are to color one of the two equal parts.
- For the second part of the page, the children are to color one-half of the shapes in each set.

Color one fourth of each shape.



Answers may vary.



Showing one-fourth

(two hundred twenty-nine) 229

LESSON OUTCOME

Identify one-fourth of an object or a shape

Materials

objects to be shared (apples, sandwiches, cookies), display board and cutouts, a sheet of paper and crayons for each child

Vocabulary

one-fourth, fourths

RELATED ACTIVITIES

- Cut pictures from magazines or catalogues, paste them on cardboard, and cut them into four equal parts. Have children put the pictures together.
- Have the children make a display of paper plates that have been marked or cut to show one-half and one-fourth. Some children may discover that one-half is the same as two-fourths.

LESSON ACTIVITY

Before Using the Page

- Cut an apple into halves. Ask how many persons can share the apple. Then cut each half into two equal parts. Ask children how many parts there are now and how many persons can share the apple. Explain that because there are four equal parts, one part is called *one-fourth*. Point to each part in turn and ask what it is called. Give one fourth of the apple to each of four children to emphasize that there are four parts. Divide sandwiches and cookies into fourths and let other children share them.
- Place a cutout that is divided into fourths on the display board. Have children state how many parts there are and what each part is called.
- Give each child a sheet of paper. Draw the outline of one sheet on the chalkboard. Draw a line segment to divide the rectangle into two equal parts. Ask children if each part is one-half of the rectangle. Have the children make a fold in their sheets of paper to correspond to the line segment you

drew. Ask what each part is called. Now draw a second line segment so that the rectangle will be marked into four equal parts. Ask children what each part is called. Have the children make another fold in their sheets of paper to correspond to the second line segment you drew. Have them color one of the four equal parts.

Using the Page

- Read the instruction to the children. Ask the children into how many parts each of the drawings is marked. Ask if the four parts of each drawing are equal. Have the children color over the one-fourth indicated in the "window". Then have the children color one fourth of each of the other drawings.
- After the children have completed the page, you may wish to ask what part of each drawing they colored and how many fourths are not colored.

LESSON OUTCOME

Recognize an object or a shape divided into four equal parts

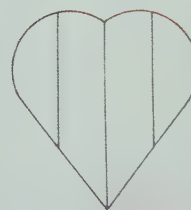
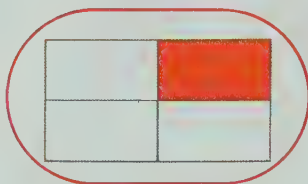
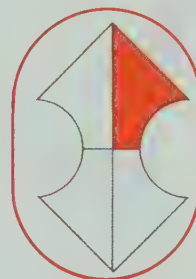
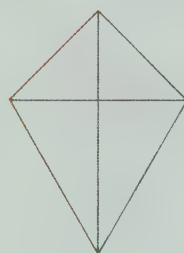
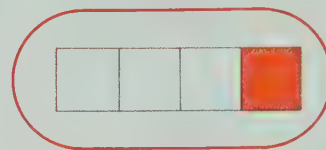
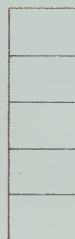
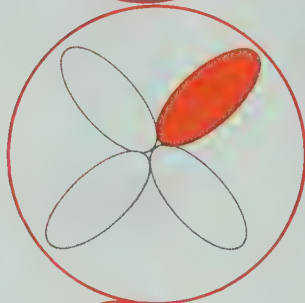
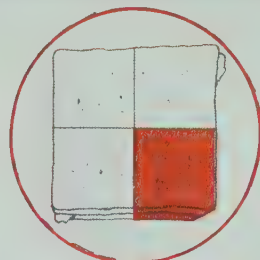
Materials

display board and cutouts, a sheet of paper and crayons for each child

RELATED ACTIVITIES

- Give each child a sheet of paper. Have the children fold them in half and then in half again. Demonstrate how to cut the paper so that they can make a design. Have the children do the cutting and then open out the paper. Ask how many parts there are, if the parts are equal, and what each part is called. Have the children color one fourth of their designs. Include some of these with the display of halves and fourths suggested in *Related Activities* on page T295.

Ring, and color one fourth.



Ring those that show one-fourth and color one fourth.

230 (two hundred thirty)

Recognizing one-fourth

LESSON ACTIVITY

Before Using the Page

- Display a circular cutout that has been marked into four equal parts. Ask how many parts there are and what each part is called. Display a circular cutout of the same size that has been marked into four parts that are not of the same shape and size. Ask how many parts there are. Ask if each part is one-fourth of the shape. Ask children to explain why each of the parts is not one-fourth.

Display other pairs of shapes marked into four parts, one shape having equal parts and the other not. Emphasize that in order for each part to be one-fourth, the parts must be of the same size.

- Draw several shapes on the chalkboard. Mark some of them into four equal parts and others into four parts that are not of the same size. Ask children to describe each shape and tell how many parts it has. Ask whether the parts are of the same size, and if so, what each part is called. For the shapes that are not marked into equal parts, ask children to suggest where lines

should be drawn to show four equal parts. Have children draw the line segments required.

Using the Page

- Read the instruction to the children. Tell them that they are to ring only the drawings that are marked into four equal parts. Then they are to color one of the four equal parts.

Discuss the fact that the sandwich is marked to show four equal parts and one of the four parts is indicated. Have the children trace over the dotted ring and color the one-fourth indicated. You may wish to have the children ring all the drawings that show fourths before they start to color.

- After the children have completed the page, you may wish to discuss each drawing that is not ringed and have the children explain why each part is not one-fourth. For example, the fifth shape does not show fourths because there are five equal parts.

Challenge children to describe other ways that some of the drawings could be marked to show fourths.

Complete.

OBJECTIVE

Complete basic addition and subtraction facts, sums and minuends to 12

Materials

a piece of paper for each child, crayons for each child

RELATED ACTIVITIES

- Have children practise basic addition facts by playing the game "Domino Cover-up" in groups of three players. Prepare three cards so that nine dominoes will fit on each card. Show numbers in the positions given below.

1	10	7
8	6	2
4	2	9

2	6	8
9	5	7
7	11	3

3	6	10
7	10	4
2	8	12

Place a set of dominoes face down and have the three players take turns drawing dominoes. If the number of spots on the domino is equal to a number on the player's card, the domino is placed on the card. If there is no number on the card corresponding to the number for the domino, the domino is replaced and mixed with the other dominoes. The player who first places three dominoes horizontally, vertically, or diagonally is the winner.

$7 + 3 = 10$ $9 - 3 = 6$
 $4 + 1 = 5$ $5 + 5 = 10$
 $10 - 5 = 5$ $2 + 7 = 9$
 $8 - 3 = 5$ $6 + 2 = 8$
 $6 + 5 = 11$ $5 + 3 = 8$ $4 + 5 = 9$ $6 + 6 = 12$
 $7 - 2 = 5$ $8 + 2 = 10$ $10 - 4 = 6$ $3 + 8 = 11$
 $5 - 1 = 4$ $12 - 6 = 6$ $10 - 3 = 7$
 $4 + 6 = 10$ $6 - 1 = 5$ $4 + 2 = 6$
 $9 - 4 = 5$ $8 - 4 = 4$
 $11 - 8 = 3$ $6 + 3 = 9$

Addition and subtraction practice: sums and minuends to 12

(two hundred thirty-one) 231

LESSON ACTIVITY

Before Using the Page

- Review addition and subtraction facts having sums and minuends to 12 by using an activity that the children enjoy. If you need a new activity, you may wish to try the following one.

Assign one sum (9, 10, 11, or 12) to each child and the instruction to write two addition facts and two subtraction facts on a piece of paper. If the two addition facts and the two subtraction facts are not related to each other, the activity will provide even more practice. For example, a desirable response for the sum 9 would be $3 + 6 = 9$, $7 + 2 = 9$, $9 - 4 = 5$, and $9 - 1 = 8$. While the children are writing the four number sentences, draw on the chalkboard two charts in the form shown below, one for sums of 9 to 12 and the other for minuends of 9 to 12.

9	10	11	12
$9 + 0 = 9$ $8 + 1 = 9$	$9 + 1 = 10$	$9 + 2 = 11$	$9 + 3 = 12$

9	10	11	12
$9 - 0 = 9$ $9 - 1 = 8$	$10 - 1 = 9$	$11 - 2 = 9$	$12 - 3 = 9$

As the children read number sentences in turn from their papers, record them in the appropriate columns. When all the sentences have been recorded, fill in any number sentences that are missing for each sum and have children read them. This activity will provide a complete review of all the facts for sums and minuends of 9 to 12.

Using the Page

- Have the children complete each number sentence. After they have completed the page, you may wish to have them try to find the nine pairs of related addition and subtraction facts. Each pair may be colored a different color.

LESSON OUTCOME


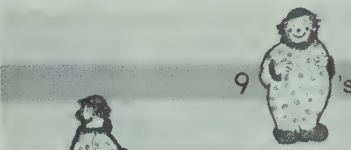
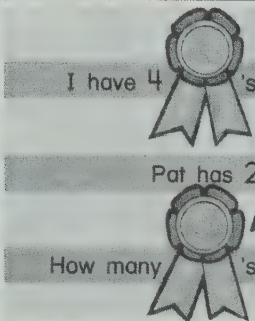
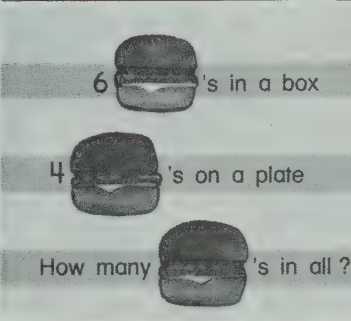
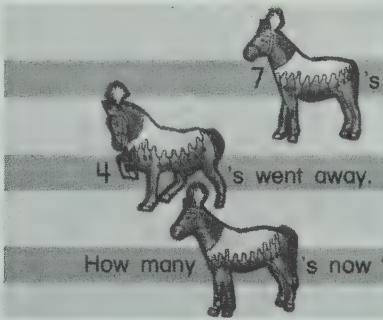
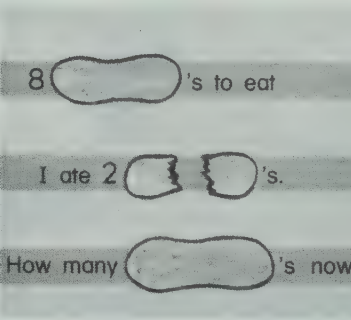
Write a number sentence for a story problem and answer the question of the problem

Materials

number concept cards for 0 to 10, and cards showing the symbols +, -, and = for each child

RELATED ACTIVITIES

- Ask each child in turn to tell a story and have the rest of the children write the number sentence that describes the action. Encourage the children to include both additive and subtractive situations.
- Have children find pictures in magazines that suggest additive or subtractive situations. Encourage them to tell a story about each picture and write a number sentence to describe the action.
- Play the game "Flash" described on page T303.

 <p>5 's</p> <p>3 more 's come.</p> <p>How many 's in all?</p> <p>$5 + 3 = 8$</p> <p>8</p>	 <p>9 's</p> <p>3 's went away.</p> <p>How many 's now?</p> <p>$9 - 3 = 6$</p> <p>6</p>
 <p>I have 4 's.</p> <p>Pat has 2 's.</p> <p>How many 's in all?</p> <p>$4 + 2 = 6$</p> <p>6</p>	 <p>6 's in a box</p> <p>4 's on a plate</p> <p>How many 's in all?</p> <p>$6 + 4 = 10$</p> <p>10</p>
 <p>7 's</p> <p>4 's went away.</p> <p>How many 's now?</p> <p>$7 - 4 = 3$</p> <p>3</p>	 <p>8 's to eat</p> <p>I ate 2 's.</p> <p>How many 's now?</p> <p>$8 - 2 = 6$</p> <p>6</p>

Write a number sentence for each problem.

232 (two hundred thirty-two)

Solving problems, sums and minuends to 10


LESSON ACTIVITY


Before Using the Page


- Tell the children a story involving an additive or a subtractive situation. For example, you might say, "There were six children playing in the park. Four of them went home. How many children were left?" Have the children use their concept cards and symbol cards to form a number sentence that describes the situation ($6 - 4 = 2$) and state that there were two children left in the park.

You may wish to use cutouts to illustrate each story and/or have the children use counters to help them visualize the action.

- Write a story on the chalkboard in the form shown on page 232, for example,

3  's

2 more  's come.

How many  's in all?

Read the story aloud with the children. Have one child use objects to illustrate the action. Ask if the action is a joining action or a separating action. Ask what number sentence will describe the action. Have the children use their cards to form the number sentence. Ask one child to write the sentence $3 + 2 = 5$ on the chalkboard so that the other children can check their work. Ask a child to answer the question of the problem (5). Continue this activity using both additive and subtractive situations.

Using the Page

- Ask children in turn to read aloud each story to determine whether they can interpret it correctly. Ask whether the first problem is a joining action or a separating action. Have the children write the number sentence on the line and then write the answer in the frame. Let the children continue on their own, while you give help to those who are having difficulty with either the words or the number sentences.

LESSON OUTCOME




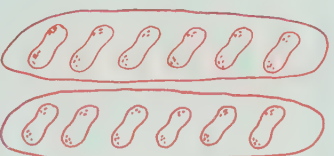

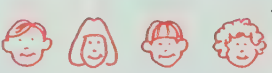
Illustrate a word problem in an attempt to solve the problem

Materials

twelve counters and a sheet of paper for each child

RELATED ACTIVITIES

- Continue the activity in which each child tells a story and the rest of the children write the number sentence that describes the action.
- Prepare cards on which there are story problems. For each story problem include three number sentences of which only one is correct. Have the children choose the correct number sentence and be prepared to explain why the other two sentences do not describe the situation.

<p>I have 4 apples. Pat has 5 apples. How many apples in all? <u>9</u></p> 	<p>See 7 cats. 5 cats go away. How many cats are left? <u>2</u></p> 
<p>I have 10 toys. Bob has 6 toys. How many more toys have I? <u>4</u></p> 	<p>Share 12 nuts between 2 girls. How many nuts for each girl? <u>6</u></p> 
<p>I have 3 pairs of shoes. How many shoes have I? <u>6</u></p> 	<p>See 4 children. How many eyes have they? <u>8</u></p> 

Draw a picture for each situation.

Illustrating word problems (two hundred thirty-three) 233

LESSON ACTIVITY

Before Using the Page

- Children will be able to solve problems more easily if they can draw a picture that illustrates the action. This pictorial representation often suggests the operation that must be performed on the numbers.

Tell a story such as: "I have five apples. I get two more. How many apples have I now?" Have a child interpret the first sentence by forming a set of five counters. Have a second child interpret the second sentence and push two more counters toward the five counters. Ask children to describe the action and to state the number sentence that describes the action.

Ask a child to draw a set of five apples and then a set of two apples on the chalkboard to illustrate the problem. Ask another child to write the completed addition sentence on the chalkboard.

Tell a story such as: "I had four cookies. I ate two of them. How many cookies are left?" Have children interpret the story first by using counters and then by illustrating it on the

chalkboard. Repeat the procedure for many different stories, gradually moving from using counters to only drawing illustrations on the chalkboard.

- You may wish to give the children pieces of paper and have them illustrate one or two story problems that you tell before they begin the page.

Using the Page

- Read each story with the children before they begin to draw the pictures required. Give each child twelve counters so that each situation can be represented before the picture is drawn. Let the children work independently. Give help to those children who are having difficulty with either the words or deciding how to illustrate the situation.

OBJECTIVE

Complete a table of basic addition facts for sums to 12

Materials

small objects for making sets

RELATED ACTIVITIES

- Have children construct a table showing the addition combinations for sums from one to ten.

1	2	3	4	5
1 + 0	2 + 0			
0 + 1	1 + 1			

Have the children observe the patterns in the table as it is being completed.

You may also wish to have the children construct a similar table showing the subtraction combinations that result in the numbers from ten to one.

10	9	8	7
10 - 0	10 - 1	10 - 2	
	9 - 0	9 - 1	
		8 - 0	

Complete.

234 (two hundred thirty-four) Reviewing addition facts, sums to 12

LESSON ACTIVITY

Before Using the Page

- The basic addition facts that have been presented in this book are all included in the table on page 234. To prepare the children for completing the table, review the fact that the order in which two numbers are added does not matter.

Display a set of five objects and a set of three objects. Move the three objects to join the five objects. Ask a child to state how many there are and to write the addition sentence ($5 + 3 = 8$) on the chalkboard. Start again with the set of five objects and the set of three objects. Move the five objects to join the three objects. Ask a child to state how many there are and to write the addition sentence ($3 + 5 = 8$) on the chalkboard. Continue this activity for other pairs of numbers. If time is available, you may wish to discuss the subtraction sentences that are related to the addition sentences.

Using the Page

- The table is designed so that the first addend appears on a yellow bird and the second addend appears on a green bird.

Work with the children as they complete the first two rows. Then have them complete the rest of the table on their own.

- After the children have completed the table, ask the following questions:

“What do you notice about the numbers as you look across each row?”

“What do you notice about the numbers as you look down each column?”

- You may wish to have the children color the birds that show pairs of related addition facts; for example, the shape for $2 + 3$ and the shape for $3 + 2$ might be colored red.

Complete.

Page 235

OBJECTIVE

Complete basic addition and subtraction facts, sums and minuends to 12

Materials

number concept cards for each child

RELATED ACTIVITIES

- You may wish to have the children add three numbers. Prepare a work sheet of four-leaf clovers showing three numbers for which the children are to find the sum and write it on the fourth leaf.



Discuss the fact that the numbers can be added in more than one way. In the first example, one child may add 2 and 3 and then 5 and 4. Another child may add 4 and 3 and then 7 and 2. Encourage the children to add one way and then add the other way to check their work.

Addition and subtraction practice: sums and minuends to 12

(two hundred thirty-five) 235

LESSON ACTIVITY

Before Using the Page

- Draw balloons on the chalkboard in an arrangement as shown on page 235. Write numerals on the balloons. Tell the children that to find the number that belongs in the outside ring they are to add the number on the second balloon to the number on the balloon in the centre. Have children take turns finding the sum of each pair of numbers. Remind the children of how they completed number wheels.

Draw another set of balloons for reviewing subtraction facts. Again have children take turns finding the number for the outside ring.

- Write the addition sentence $2 + 8 = \underline{\quad}$ on the chalkboard. Have the children hold up the numeral side of the number concept card for completing the sentence. Write the related subtraction sentence $10 - 8 = \underline{\quad}$. Have the children hold up the number concept card to show the number needed to complete the sentence. Ask a child to explain how the two sentences are related. Emphasize that two objects are

joined by eight objects for the first sentence and that eight objects are separated from the group for the second sentence. Repeat the procedure by writing other pairs of related addition and subtraction sentences.

Continue the above procedure, but write only the addition sentence on the chalkboard. Have children state the related subtraction sentence that "undoes" the action in the first sentence. Repeat with several examples and then write only the subtraction sentence on the chalkboard. Have children state the related addition sentence. Emphasize that the action "undoes" the first one.

Using the Page

- Ask the children to identify the three sets for addition and the three sets for subtraction. Point to the first set for addition and ask what the sum of 3 and 2 is. Have the children trace over the dotted 5. Point to the first set for subtraction and ask the children to subtract 4 from 9. Have them trace over the dotted 5. Then let the children continue on their own.

OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

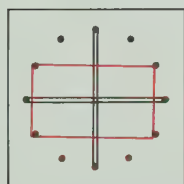
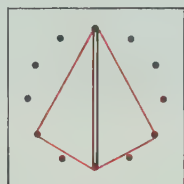
Materials

unmarked metre sticks, display board and cutouts, crayons for each child

RELATED ACTIVITIES

- You may wish to have the children play the game "My Choice" described on page T303.

- If twelve-point geoboards are available (see page T23), they can be used to reinforce fraction concepts. Show a shape and have the children copy the shape on their geoboards. Ask the children to place a rubber band on the geoboard to mark the shape into halves. Two rubber bands can be used to mark the shape into fourths. Have the children explore shapes that can and shapes that can not be marked into halves (fourths).



Complete.

$$9 + 1 = 10$$

$$8 + 3 = 11$$

$$7 + 5 = 12$$

$$11 - 4 = 7$$

$$10 - 8 = 2$$

$$12 - 4 = 8$$

$$\begin{array}{r} 3 \\ + 7 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 5 \\ + 6 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 3 \\ + 9 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 12 \\ - 6 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 11 \\ - 8 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 12 \\ - 7 \\ \hline 5 \end{array}$$

What number ?

$$3 \text{ fives } 15$$

$$5 \text{ fives } 25$$

$$8 \text{ fives } 40$$

$$30 + 5 35$$

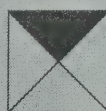
$$60 + 5 65$$

$$85 + 5 90$$

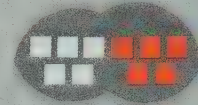
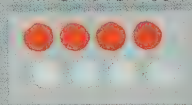
Color the seventh bird yellow. Color the fifth bird blue.



Ring one half. Use a \checkmark to show one fourth.



Color one half of each set.



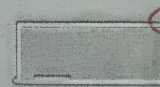
Ring.



longer

than a metre stick

shorter



longer

than a metre stick

shorter

236 (two hundred thirty-six)

CHECKUP

LESSON ACTIVITY

Before Using the Page

- To review some of the concepts presented in this unit, have children use the ordinal number concepts *first* to *ninth* by asking them questions about things in the classroom or on display; for example,

"Which boy in the first row is wearing red?"

"Which girl in the fourth row is wearing glasses?"

"Which girl in the second row has red hair?"

- Use story problems to review addition and subtraction facts having sums of 11 and 12; for example,

"I saw 7 children on the playground.

4 more children came.

How many children were on the playground?"

"There were 12 birds on a tree.

4 birds flew away.

How many birds were left?"

- Ask children to take a number of steps in a straight line. Ask other children to use unmarked metre sticks to find out whether

the distances are longer than a metre, shorter than a metre, or about the same length as a metre. For the distances that are longer than a metre, ask children to state about how many metres there are in each distance. Now that children know the concepts one-half and one-fourth, you may wish to have the children state distances so that parts of a metre are included, for example, "about two and one-half metres".

- Have children start at 5 and count by fives. Also, have them start from any number of fives and count to a particular multiple of five. Ask questions such as: "How many are 3 fives?" "Which number is greater, 6 fives or 8 fives?"

- Have children identify one-half of an object or a shape, one-half of a set, and one-fourth of an object or a shape.

Using the Page

- Direct the children's attention to the word *Checkup* at the bottom of the page. Review the purpose of this page. Read and discuss each instruction with the children to ensure that they know what they are to do for each set of exercises. Each child's performance on this page will help you to determine what reteaching is necessary.

Games and Activities

Poem for page 217

FIVE LITTLE CHICKENS

Said the first little chicken,
With a queer little squirm,
"Oh, I wish I could find
A fat little worm!"

Said the second little chicken,
With an odd little shrug,
"Oh, I wish I could find
A fat little bug!"

Said the third little chicken,
With a sharp little squeal,
"Oh, I wish I could find
Some nice yellow meal!"

Said the fourth little chicken,
With a small sigh of grief,
"Oh, I wish I could find
A green little leaf!"

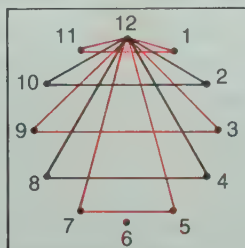
Said the fifth little chicken,
With a faint little moan,
"Oh, I wish I could find
A wee gravel-stone!"

"Now, see here," said the mother,
From the green garden-patch,
"If you want any breakfast,
You must come and scratch."

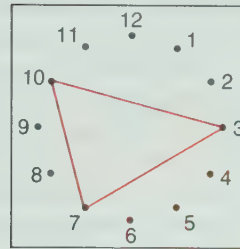
Twelve-Point Geoboard Activities (for page 225)

Provide the children with twelve-point geoboards and rubber bands as described on page T23, or adapt the activities for twelve-point geopaper. Have the children number the pegs from 1 to 12 to correspond to the locations of the numerals on a clock face.

1. Ask the children to place a rubber band around three pegs so that an addition sentence for a sum of 12 is illustrated; for example, a child might place a rubber band around the pegs for 3, 9, and 12. Have several children hold up their geoboards for the others to see, and state the addition sentence. Ask the children to place rubber bands around three pegs for sums of 12 in as many ways as they can. Discuss the difficulty in showing $6 + 6 = 12$ on the geoboard. Adapt the activity for other sums.



2. Name a number to be considered a sum, for example, seven, and have children illustrate the sum as many ways as they can on their geoboards. Have them write the corresponding addition sentences.
3. Have the children work in pairs with one geoboard. One child names a number to 12 as a sum. The other child illustrates one addition sentence for the sum on the geoboard. Both children write all the related addition and subtraction facts for the illustration.



$$3 + 7 = 10$$

$$10 - 7 = 3$$

$$7 + 3 = 10$$

$$10 - 3 = 7$$

Flash (Game for page 232)

Materials

a set of addition and subtraction flash cards for sums and minuends to 12
a set of numeral cards for 0 to 12 for each player

Rules

1. Shuffle the flash cards and place them face down in front of the players.
2. Shuffle all the numeral cards, deal five to each player, and place the rest in a pile.
3. The game begins when the leader turns up a flash card.
4. The player who first puts down the correct numeral card for the flash card scores a point and turns up the next flash card.
5. The player who first uses all her/his numeral cards is the winner of that round.
6. Five more numeral cards are dealt to each player and the game continues.

My Choice (Game for page 236)

Materials

three sets of numeral cards for 1 and 12

Rules

1. The cards are shuffled and shared by three children.
2. The first child plays a card and the second child plays another card.
3. The third child must say "add" or "subtract" and select one card from her/his hand showing the result of performing the operation on the two numbers on the cards played.

6 2 Add 8 11 4 Subtract 7

4. If the result is correct, the player wins the three cards.
5. If the third player cannot give the correct result, the cards are placed in a discard pile.
6. The third player then plays the first card in the next round, and the first and second players of the first round now become the second and third players of the new round.
7. At the end of the game the player with the most cards is the winner.

Unit 12 Overview

In this unit the basic addition and subtraction facts with sums and minuends of 10, 11, and 12 are reviewed and reinforced. The calendar is presented and children learn to recognize the names of the days in the week. The concept of surface (area) is introduced by having children count the squares in a variety of shapes. Then they are challenged to indicate on a grid different regions that contain given numbers of square units. Challenging problems are presented in which the total cost of purchasing two illustrated items is first determined and then the necessary coins are selected for amounts to 12 cents. Reading and recording time, to the hour, is reviewed and then extended to reading and recording time, to the half-hour. Tangram pieces are introduced to provide interesting manipulative experiences in reproducing shapes and in creating original combinations of shapes. Two *Checkups* are provided at the end of the unit: one page deals with the work of Unit 12, and four pages offer a comprehensive *Year-End Checkup* of the content of *Starting Points in Mathematics 1*.

Unit Outcomes

Number

- complete addition and subtraction facts, sums and minuends of 10, 11, and 12

Measurement

- make and use a calendar for a particular month
- demonstrate an awareness of surface
- show a region that has a given area in non-standard units
- select the coins needed to buy two items worth not more than 12 cents
- interpret time, to the half-hour
- read and record time, to the half-hour

Geometry

- manipulate and match shapes as part of a design
- use models to obtain solutions for problems

Background

Number: In the overview of Unit 11, it is mentioned that addition and subtraction facts for sums and minuends of 11 and 12 are optional and should be considered only for the more capable children. The practice exercises on page 240 show groups of these related facts and then other number facts at random. These other facts may be used as a timed test if the children have reached the required level of achievement.

Measurement: Amounts of money to 12 cents are used to reinforce number facts for sums to 12. Children select two items for purchase and determine the total price to be paid and what coins would be used to pay. The teaching suggestions for page 241 also reverse this procedure by asking children to find pairs of items that can be purchased for a given amount of money.

From everyday use of dates, many children will be familiar with the calendar and some of its uses. The children become involved in naming the days of the week in order and reading days and dates. The calendar on page 237 is suggested for use as a calendar for the current month.

The topic of area is introduced in this unit. To develop the concept of area, children need a variety of informal activities with surfaces of various kinds, for example, counting the tiles on the floor or the ceiling of a room. Other surfaces may be considered, such as the top of a table and the faces of a box.

The size of any surface can be stated in terms of how many smaller unit surfaces would be required to cover it. Children should have experiences trying to cover surfaces such as desks or tables, using various shapes such as circles, triangles, squares, and rectangles. They will find that some units leave too many spaces uncovered and that the rectangle and the square are the best. At the same time they may discover that squares are better than rectangles because turning them does not alter their fit. The children may find the areas of surfaces by counting the squares singly, or they may discover that the squares can be counted by twos or fives, for example. The term *area* is not used at this stage.

Telling time, to the hour, is reviewed and extended to include the telling of time to the half-hour. Orally, two forms are used to indicate the half-hour: *half-past six* and *six-thirty*. Children are shown how to record the time in the form 6:30.

Geometry: The fascinating puzzle called the *tangram* is presented in this unit to provide interesting experiences with geometric shapes. The tangram is a puzzle consisting of seven simple shapes, but there is an extraordinary number of different geometric and pictorial arrangements in which the pieces can be put together. Your children may be interested in the legend of the origin of the puzzle. It is said that one day a Chinese scholar was walking with a ceramic tile in his hands when he tripped. The tile broke into seven pieces. The scholar spent the rest of his life trying to put the tile back together again.

Whole volumes have been published in China of tangram patterns that people have made and solved. Adults as well as children enjoy the challenge of duplicating patterns and creating new arrangements. Reproducing particular shapes involves the use of special problem-solving skills. Most beginners proceed by trial-and-error manipulation of pieces until they find the set and arrangement that provide the desired result. Some problems can be solved in more than one way and sharing solutions can be a very worthwhile learning experience.

Teaching Strategies

The calendar can be used to guide children through a variety of interesting mathematical experiences. For example, cardinal and ordinal numbers are easily related by using a calendar, as both are represented by dates. May 5, for example, is the fifth day of the month, but it also indicates that five days in the month have elapsed (including that day).

Special attention may need to be drawn to the facts that a month does not always start with a new week and a week of seven days does not necessarily start with Sunday. A number line with the dates for one month and extending into the next month can be used for both concepts. The days of the week may be shown under each date and a strip of paper seven units long can be used to indicate a variety of periods one week long, such as Tuesday to Monday, Thursday to Wednesday, and Sunday to Saturday.

For activities in connection with area, various flat materials such as sheets of paper and tiles will be required. Several sizes

and shapes should be available, but instructions will need to be given to the children to use only one size and shape at a time. Envelopes or boxes for storing the units will help children to keep them in order. Paper ruled into large squares, such as on page T341, is useful for the study of area. Children may use this paper for tracing around irregularly shaped objects such as leaves and counting the squares covered by each leaf.

Telling time is often taken for granted as a relatively easy task, but the numerals on the dial of a clock only refer to the hours. When the minute hand sweeps past the numerals, each numeral must be interpreted in fives. For example, the minute hand pointing to the 6 means thirty minutes, and this can be confusing to children. To help them overcome this difficulty, it is suggested that a demonstration clock be fastened to a larger backing sheet on which the numerals 5, 10, 15, . . . , 60 are printed to show minutes around the dial. Children can then study the chart, practise counting by fives to 60, and relate some of the numerals for the hours to the number of minutes. Emphasis should be placed on the 6 and the thirty minutes it indicates, but more capable children may learn the other associations.

Tangrams allow children to have fun solving puzzles that are frequently open-ended; that is, puzzles that have more than one solution. For this reason, the experiences with tangrams should not be restricted to those indicated on pages 242 and 243. Tangram pieces should be available for several weeks so that children can use them in their spare time.

When introducing tangrams allow children time to explore and experiment with the pieces. Sets made of different colors can be combined to provide many more pieces of the same shapes, and simple patterns and borders can be made from these. Easy challenges may be offered by limiting the children to certain shapes, such as making a design using only the largest triangles and the smallest triangles, or using the small square and the smallest triangles. The picture on page 242 uses all seven pieces of one set, while the shapes on page 243 are made with only the two smallest triangles.

Tangram pattern cards showing full-scale shapes and designs should be made and placed with the sets of pieces for children to use. The cards may be numbered from the easier puzzles to the more difficult so that appropriate cards can be presented to children of different abilities. In this way children may progress from the simpler cards to the more difficult ones. However, some children who are quite competent in using numbers and operations are often surpassed in the use of tangrams by children who have difficulty with numbers and operations. Skills used with tangrams are of a different kind. This is one reason why tangrams fascinate – and frustrate – so many people.

The *Checkup* at the end of the unit tests skills and concepts introduced in the unit with one exception. Perceptual skills involved in the use of tangrams must be tested by working with children in small groups, so that their responses can be observed as they manipulate the pieces.

The *Year-End Checkup* on pages 247 to 250 concentrates on the major number concepts and on operations that are developed in Book 1. Other testing will be required for topics that cannot be measured by the paper-and-pencil-response technique to which the book is limited. For these topics, oral instructions or questions may be given; and the children may respond with a verbal answer or a physical action of manipulating

objects. These topics include cardinal and ordinal number concepts, concepts related to size and position, capacity and mass, time of day, interpretation of the calendar, the inverse relationship between addition and subtraction, the commutative and associative properties of addition, and certain geometric concepts.

A checklist of the skills and concepts can be used to record each child's level of achievement. Besides a check, written comments may be made to describe the child's performance; for example, which number facts are not well known or if the place values of ones and tens are interchanged in some teen numerals. A checklist of the major concepts and skills is given on pages T349 and T350. If this list is too comprehensive, it may be adapted to suit a particular program.

Materials

- a calendar for the current month on which the days of the week are not abbreviated
- objects having different textures
- objects for units of area (sheets of paper, tiles, envelopes, small cards)
- cutouts having square, triangular, and circular shapes
- crayons for each child
- number concept cards for 0 to 12 for each child
- real money, play money, or coin cutouts from copies of page T337
- items marked with prices from 1¢ to 9¢
- cards marked with amounts from 1¢ to 12¢
- felt, plastic, or cardboard tangram pieces for each child (See page T347.)
- pictures created from tangram pieces (See page T348.)
- display board
- demonstration clock, real clock, a paper-plate clock face for each child

Vocabulary

calendar	surface
month	tangram
day	half-past
birthday	minutes
holiday	

Unit 12 Theme – People and Work

The purpose of this theme is to make the children aware of the range of occupations available to them and how many of these are related and interdependent, for example, those in the medical fields.

Set up a display of pictures of people engaged in various occupations. Be careful to avoid the stereotypes of male and female roles, for example, male doctors, female nurses, female teachers. Display books telling about various occupations. Try to include some books that the children can read. Include parts of uniforms, tools, and other props that will encourage role playing of various occupations. Include both individual and class work as each activity is completed.

LANGUAGE ACTIVITIES

1. What Will You Be?

Ask the children what they might like to be when they grow up. Record their answers on a chart. Ask what other occupations they could have. Include these on the list. Each day encourage the children to think of occupations that are not on the list. By the end of the time allotted for this theme, the list of occupations should be impressive.

2. Learning About Occupations

Ask the children what methods they might use to find out about occupations that interest them. They may suggest interviewing people, reading books, and observing people at work.

Each day select several occupations and choose one of the methods listed to find out about each occupation. After the occupations have been selected, make a list of the questions that the children wish to ask, then proceed to find the answers by using the method chosen.

This activity will generate a lot of oral language. Encourage the children to record their findings to assure experience with written language. The children could keep their information in individual books, or you may wish to have them make a class book for this theme.

3. Word Activities

Print on individual cards the names of occupations from the list for Language Activity 1. Have the children perform word-card activities similar to the following:

- Place the word cards in alphabetical order.
- Find the card for the occupation with the longest name.
- Find the card for the occupation with the shortest name.
- Sort the cards according to the initial consonants of the words.
- Find all the words that have smaller words inside them.
- Find all the words that have double consonants.

4. Business Ventures

Divide the children in your class into about five groups. Each group is to pretend it is a company that wishes to advertise what it sells. For example, one “company” might choose to sell bicycles. The “owner” will collect pictures of bicycles from magazines, catalogues, and newspapers. Then they can plan their advertisement for the local newspaper. They will need to decide what words they will use to describe their products. Provide sheets of newsprint for them to paste the pictures

on. The advertising words can be printed beside the pictures on the newsprint. If children wish to make the advertisement look more “professional”, they can hunt for the words in old publications and then paste them with the pictures.

5. A Radio Program

Using books and films about radio and radio broadcasting, discuss the radio, radio programs, and the radio announcer’s role with the children. If possible, arrange for the class to tour a radio station and interview a radio announcer.

After the discussion and the tour of the radio station, have the children work individually or in groups to plan a radio program. Each group will have to decide which part of the radio program it will present: news, interviews, interesting facts, music, recipes. When the individual parts are completed, each group should rehearse its part separately and then with the other groups.

You may wish to record the program on tape. If the children make a pretend radio from a box, the tape recorder can be placed inside the “radio”.

MATHEMATICS ACTIVITIES

1. Classifying Occupations

Use the word cards from Language Activity 3. Have the children sort the cards into such categories as

Outside Work
Office Work
Health Work
Jobs Done at Night
Work Where a Vehicle Is Driven

2. Matching People to Their Jobs

Prepare a set of cards, each showing a picture of a person engaged in a different occupation. On a smaller card, write one sentence to describe what that person is doing. Place the picture cards and the description cards in a large envelope. Encourage the children to match the pictures with the descriptions. If the cards are coded on the back, the children can check their work themselves.

3. Occupations and Time

Time is very important in some occupations. Discuss this idea with the children. Some people work by appointment, so time is important to them. List some of these people (doctor, dentist, hairdresser). Some people perform jobs in which things have to be timed. List some of these people (baker, piece worker, bus driver). Have the children try to think of some jobs in which time is not a major concern.

4. Occupations and the Calendar

Some occupations require people to work only at certain times of the year. Have the children establish the months when the following people work:

snowplow operator
gardener
swimming-pool lifeguard
hockey player
school-bus driver

Challenge the children to think of other occupations that require people to work only certain months of the year.

5. Graphing Occupations

Have the children tell the occupations of their fathers and mothers. List these occupations on a chart. Make a bar graph to show which occupations are the most common.

SCIENCE ACTIVITIES

1. People in Recreation

Discuss with the children and record things that people do for recreation. They may suggest the following:

sports	night-school courses
crafts	theatre
travel	music
reading	movies

Beside each kind of recreation, list occupations that relate to the activity; for example, reading suggests a librarian and a bookstore clerk.

Each day select an occupation from the list for study. If possible, have someone from each occupation visit the school. You may prefer to take the children on a trip to see the person on the job.

You may wish to explore questions similar to the following:

“What tools or materials does the person require to perform the job?”

“Is any special clothing required for the job?”

“What kind of training is required for the job?”

“During what part of the day does the person work?”

“Is this the only job the person has?”

SOCIAL STUDIES ACTIVITIES

1. Hospital Occupations

Although most children will be aware that doctors and nurses can be found in hospitals, they may not realize that people of many other occupations are needed to make a hospital run smoothly. Through questioning establish other occupations in a hospital, such as

X-ray technician	admitting staff
laboratory technician	typist
orderly	dietician
nursing assistant	cook
records clerk	cleaner

Have the children illustrate these occupations and assemble a book entitled “Hospital Helpers”.

2. Other Health Occupations

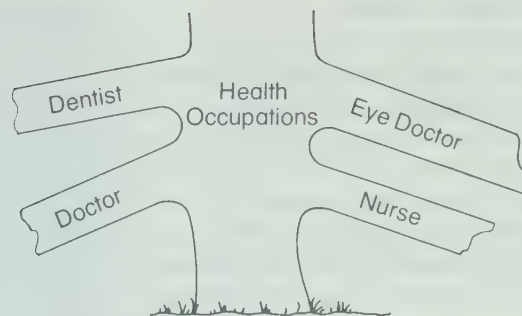
Hospitals are not the only places where people are concerned with our health. Discuss with the children other occupations in the health field, such as

family doctor	eye doctor
school nurse	fitness adviser
dentist	nutritionist

Discuss how each person makes a contribution in terms of the prevention of poor health and illness.

3. Related Occupations

Begin a study of occupations and how they are related and interdependent on other occupations. This interdependence can be emphasized by using a tree trunk for the main category. Related occupations can be shown on limbs of the tree.



Pictures from magazines, newspapers, and pamphlets of people at their jobs could be pasted on the limbs. Prepare and display several of these “trees”.

4. Patchwork People

If your class has visited various people engaged in different occupations or if some of these people have visited your classroom, help the children remember these people and their work by making a patchwork design of one or more of them.

Draw a large outline of the person’s body. Mark the body into regions so that it will resemble a patchwork quilt. In each region, paste a picture of something that suggests the occupation of that person. If the outline is that of a nurse, for example, the picture could be of a hospital chart, a nurse’s uniform, a bottle of pills, and so on.

Later, if the outline is of a convenient size, it could be cut apart to make a puzzle for the children to put together.

5. The Police Department

The police department is a major institution in the area of public safety. If possible, have a police officer visit the classroom or arrange for the children to visit the police department.

Children should be aware that the police are concerned with each of the following:

Traffic Safety

- educational instruction in schools
- vehicle safety inspections
- enforcing traffic laws
- directing traffic
- safe-driver programs

Crime Prevention

- checking stores and public places after closing
- regular street patrols
- education programs regarding pickpockets, empty houses

Crime Detection

- capture and arrest of criminals
- keeping records on criminals
- investigating accidents

6. Other Safety Occupations

There are other occupations that deal with safety besides those associated with the police. Through questioning establish some of these occupations. Some examples are as follows:

crossing guard	lifeguard
security guard	referee
fire inspector	air traffic controller
food inspector	health inspector
sanitary inspector	building inspector

Have the children try to find pictures of these occupations in newspapers and magazines. Mount the pictures on a chart entitled “They Keep Us Safe” and include it in the display.

7. A Firemen's Display

Firemen and fire trucks with their ladders and hoses have a special fascination for children. Instead of visiting the fire department, arrange for firemen to bring a fire truck to the school and demonstrate the equipment. Be sure to invite other classes in the school. The children will be thrilled to be able to report the event to their parents.

After the visit from the firemen, attach a picture of a fire truck and firemen to the centre of a bulletin board. Have the children recall things that they learned about the firemen's work. Record these on cards and then place the cards at random around the picture of the fire truck. Fasten pieces of yarn between each card and the central picture. The children can refer to this display to remind them how important it is to have a fire department.

8. People in Uniform

In some occupations people are required to wear uniforms when they are at work; for example, a nurse, a policeman, a postman, and a fireman each has a special uniform.

Have the children collect pictures of people in uniform. Assemble the pictures to make a book entitled "In Uniform". Have the children discuss the appearance of each uniform and ways in which the uniform is useful not only to the person wearing it but also to others who may meet that person.

Encourage the children to find out why certain uniforms were adopted. For example, soldiers of long ago wore armor to provide protection, and more recently they wore clothes of dark and variegated colors to camouflage themselves.

9. Hat Collection

The children in your class may be interested in collecting hats worn by people in various occupations. Some of the hats might be a policeman's helmet, a chef's hat, a brakeman's cap, a skier's helmet, a gentleman's derby, a baseball player's cap. These hats could be used for discussion, oral or written stories, or role playing.

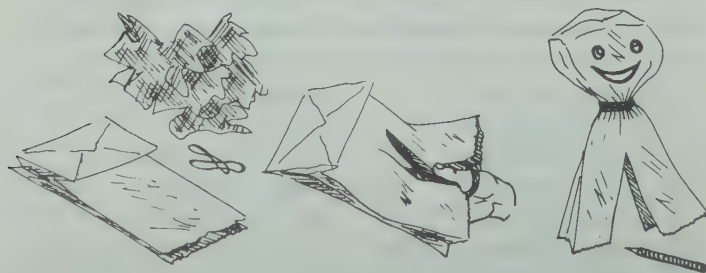
ART ACTIVITIES

1. Collage

Have each child select an occupation where certain tools or materials are required. Have the children cut these tools from construction paper. Each tool should be fairly large. Have the children arrange all the tools on a large sheet of construction paper to form a collage.

2. Paper Bag People

You will need lunch-size paper bags, rubber bands, and crumpled newspapers for making the basic body shapes. Cut one bag one-third of the way up the centre from the open end.



The two sections will become legs. Stuff the top third with newspaper to form a head. Squeeze this into a ball and fasten with a rubber band.

Stuff the next section to form the body and fasten with another rubber band. Twist each cut section to make legs and fasten each "foot" with a rubber band. Cut another bag in half vertically. Twist one piece and fasten it onto the body with a rubber band to make arms. Use a rubber band at the end of each arm to make a fist.

Have the children use scraps of fabric and yarn to dress each "person" so that it will represent a particular occupation.

MOVEMENT ACTIVITIES

Various occupations require certain physical movements. Try the following activities with the children.

1. Construction Jobs

The building trades use the motions of digging, lifting, pushing, and pulling. Have the children pretend to be house builders and use these movements. Remind the children that heavy work is involved and this should be shown in their movements.

2. Sports Occupations

Ask the children to name professional sports, such as hockey, basketball, and football. Have the children experiment with the movements necessary in these sports. Have them decide which sports involve tense movements, which sports involve fluid movements, which sports require similar movements, which sports require stretching movements, and so on.

3. Name My Occupation

Discuss with the children the kinds of things people do in such occupations as fireman, postman, policeman, teacher, nurse, doctor, zoo attendant, and garbage collector. Have a child pretend to be one of the persons discussed. For example, a "fireman" might go through the movements of sliding down a pole, driving a fire truck, using a hose, or climbing a ladder. The child who first identifies the occupation being portrayed plays the next role.

MUSIC ACTIVITIES

Many people are employed in the field of music as song writers, instrument players, and singers. Provide the children with experiences in each of these categories.

1. Writing Songs

There are two elements required for any song – the lyrics and the music. Help the children compose a four-line lyric about an occupation. Repeat the lines several times to get the rhythm of the lyric. Incorporate a simple tune. Have the children practise until the song is committed to memory.

2. Playing Instruments

Play records that introduce instruments of the orchestra to children. Discuss the different instruments and how they are played. Have older children or adults visit the classroom and demonstrate how instruments are played.

3. Singing Styles

Have the children listen to records that feature different kinds of singing (opera, folk, rock, jazz) and different kinds of voices (tenor, bass, soprano, alto). Let the children experiment with these different styles of singing and voice ranges.

Complete the calendar.

Unit 12

This month is _____.



Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Working with the calendar

(two hundred thirty-seven) ~237

LESSON OUTCOME

Make and use a calendar for a particular month

Materials

a calendar for the current month on which the days of the week are not abbreviated

Vocabulary

calendar, month, day, birthday, holiday

RELATED ACTIVITIES

- Find out if any of the children have birthdays this month. Ask the children concerned to mark their birthdays on their calendars. Ask children to find how many days there are before each birthday. You may also wish to have children mark any other special days for this month on their calendars.
- Children whose birthdays are not in the current month may wish to make calendars for the months in which their birthdays occur. Copies of page T346 may be used for this activity.

LESSON ACTIVITY

Before Using the Page

- Display a calendar and ask children if they know what month it is. Point to the name of the month and have them read the word. Ask the children to name the days of the week. Ask how many days there are in one week, which day is the first day of the week, which day is the last day of the week, which day comes before Tuesday, which day comes after Friday.

Review ordinal number concepts by having children name the second day of the week, the fourth day, the fifth day, and so on.

Ask what day of the week is the first day of the month. Ask what day of the week is the last day of the month. Ask how many days there are in this month. Ask if there are more Saturdays than Mondays, fewer Tuesdays than Fridays.

Discuss the fact that each month starts the day after the end of the previous month. For example, if a month ends on Tuesday, the beginning of the next month is on Wednesday.

Using the Page

- Read the words at the top of the page to the children. Print the name of the current month on the chalkboard and have the children print it at the top of their page and at the top of the calendar. Have the children print the numerals from 1 to 31 (30) inside the appropriate rectangles for the current month.

If you wish to use the page for a record of the weather for the current month, have the children print small numerals inside the upper right corner of each rectangle. Then each day the children can make a simple drawing to show whether the day was sunny, cloudy, or rainy.

- After the children have printed the numerals, have them do these:

1. Color inside the rectangles having the names of the days of the week that are school days.
2. Decide on what day the next month will begin.
3. Tell the date that is one or more days later than (earlier than) a given date.
4. Write all the dates for any given day, for example, all the Tuesdays.

LESSON OUTCOME

Demonstrate an awareness of surface

Materials

textured surfaces, sheets of paper, tiles, envelopes, small cards

Vocabulary

surface

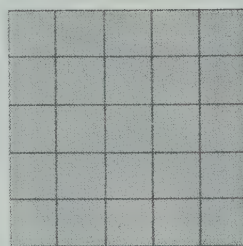
RELATED ACTIVITIES

- Have each child trace around a small book placed on a sheet of graph paper or on a copy of page T341. Have the children cut out the shapes and count the squares that each book covers. When counting the squares at this time, the children should ignore the parts of squares that are covered and record the answer as “more than _____ squares”
- Have the children trace around one of their shoes on a piece of graph paper. Have them color each whole square and count how many there are. Have the children use the same color for parts of squares that are almost whole squares. All other parts of squares should be colored a different color. Have the children give their answers in the form “_____ squares and _____ bits”. You may wish to use other irregularly shaped objects for this activity.

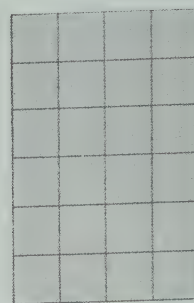
Count the squares.



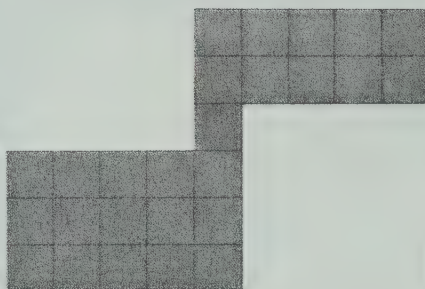
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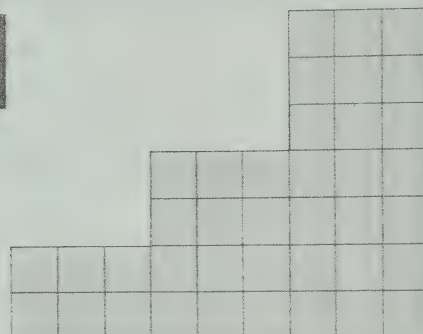
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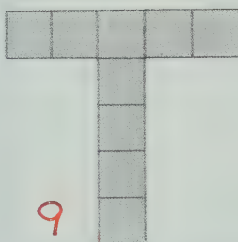
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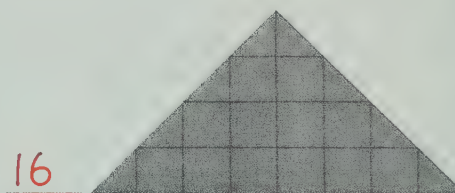
26



39



9



16

238 (two hundred thirty-eight)

Counting squares that cover a shape

LESSON ACTIVITY

Before Using the Page

- Display things having surfaces of different textures. Let the children handle them and describe the textures. Have the children sort them into categories, for example, slippery, smooth, rough, hard, soft.
- Have the children cover the surfaces of boxes with paint or paper to help them develop a feeling for covering a surface.
- Have children cover a table with sheets of paper, a desk with books, or part of the floor with tiles. Have the children count and find out how many units were needed to cover each surface.
- Have the children use envelopes and small cards to cover a table or the top of a desk. Make the children aware that more of the smaller units are needed to cover a surface.

Using the Page

- Read the words at the top of the page to the children. Have them count the squares that form each shape and record the number. After the children have completed the page, ask them

how they counted the squares. If they counted by ones, ask them to count the squares in the first exercise by twos, and the squares in the second exercise by fives. Ask for volunteers to show how the squares in the third exercise could be counted by twos. Ask a child to count the squares in the fourth exercise by fives and one more. Challenge a child to count the squares in the fifth exercise by threes. Finally, challenge a child to count the squares in the last exercise by twos.

LESSON OUTCOME

Show a region that has a given area in non-standard units

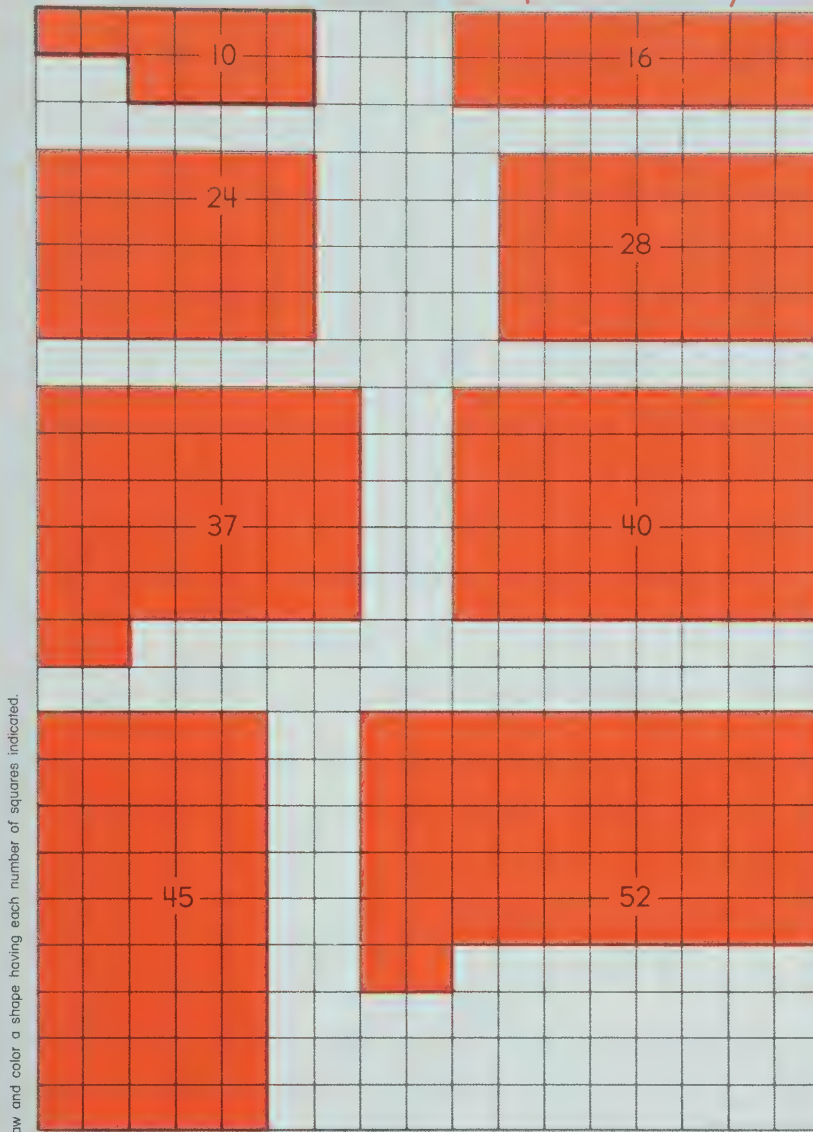
Materials

cutouts having square, triangular, and circular shapes, crayons for each child

RELATED ACTIVITIES

- Make a work sheet using copies of page T342. Have the children mark regions that show a certain number of squares. For example, to show 34 squares, have the children enclose a region consisting of 3 groups of ten and 4 ones. This activity can be used to reinforce the understanding of two-place numerals.
- Children may enjoy covering the sides, top, and bottom of small boxes with paper marked into small squares. Have the children count the squares on each surface.

Shapes will vary.



Draw and color a shape having each number of squares indicated.

Drawing shapes having a given size

(two hundred thirty-nine) 239

LESSON ACTIVITY

Before Using the Page

- Prepare cutouts having square, triangular, and circular shapes so that their measurements have the relationships shown. (See pages T327 and T328.)



Have children use the shapes to cover the top of a desk. Have them start with the square shapes and count how many square units were used. Record the number on the chalkboard. Then have the children use the triangular shapes. Discuss the difficulties that the children encounter; for example, they need parts of triangular shapes to cover completely the desk top. Have the children count and record the number of triangular

units used. Ask why more triangular units than square units were used. Repeat the procedure using the circular units. Discuss why circular units are not suitable for covering surfaces. Ask the children to count and record the number of circular units used. Have the children compare the number of circular units used with the number of square units and the number of triangular units used.

- Have the children use the square shapes to cover two surfaces of different sizes, count the units, and decide which surface is larger.

Using the Page

- Have the children mark off a shape enclosing each given number of square units. After the shapes are drawn and the children have checked that each shape does contain the number specified, have them color the shapes.

You may wish to have one group of children cut out their shapes that cover 16 squares, another group cut out their shapes that cover 24 squares, and so on. These can be pasted on sheets of paper labelled "Shapes Having Sixteen Squares", for example.

OBJECTIVE

Complete basic addition and subtraction facts, sums and minuends of 10, 11, and 12

Materials

number concept cards for 0 to 12 for each child

RELATED ACTIVITIES

- Have the children play the game "Parking Lot" in pairs as described on page T325.
- Adapt the game "Domino Cover-up" on page T297 for subtraction facts having minuends to 12. Use the opposite side of the cards to prepare game cards in a different color for subtraction. Show the numbers in the locations given below.

2	7	5	0	3	2
3	1	6	4	3	8
3	5	0	1	0	5

9	2	6
1	1	4
3	2	0

Complete the number sentences.

$4 + 6 = 10$	$12 - 5 = 7$	$1 + 9 = 10$
$10 - 6 = 4$	$7 + 5 = 12$	$5 + 5 = 10$
$6 + 4 = 10$	$12 - 7 = 5$	$11 - 4 = 7$
$10 - 4 = 6$	$5 + 7 = 12$	$3 + 7 = 10$
		$6 + 6 = 12$

$8 + 3 = 11$	$12 - 3 = 9$	$9 + 2 = 11$
$11 - 3 = 8$	$9 + 3 = 12$	$12 - 4 = 8$
$3 + 8 = 11$	$12 - 9 = 3$	$7 + 4 = 11$
$11 - 8 = 3$	$3 + 9 = 12$	$11 - 2 = 9$
		$4 + 8 = 12$

$11 - 6 = 5$	$2 + 8 = 10$	$10 - 1 = 9$
$5 + 6 = 11$	$10 - 8 = 2$	$4 + 7 = 11$
$11 - 5 = 6$	$10 - 2 = 8$	$10 - 3 = 7$
$6 + 5 = 11$	$8 + 2 = 10$	$8 + 4 = 12$
		$11 - 4 = 7$

240 (two hundred forty) Addition and subtraction practice: sums and minuends of 10, 11, and 12

LESSON ACTIVITY

Before Using the Page

- Write the addition sentence $8 + 3 = \underline{\quad}$ on the chalkboard. Have the children hold up the appropriate number concept card to show the number that completes the sentence. Write the numeral 11 to complete the sentence. Write the related subtraction sentence $11 - 3 = \underline{\quad}$ on the chalkboard and repeat the procedure. Repeat by writing other pairs of related number sentences on the chalkboard.

Vary the procedure above by writing $4 + 6 = \underline{\quad}$ on the chalkboard, having the children show the correct sum, and then having them state the related subtraction sentence ($10 - 6 = 4$).

Using the Page

- Have the children complete the six sets of related addition and subtraction facts having sums of 10, 11, and 12. After the children have completed the sentences, you may wish to have them state the subtraction fact (addition fact) related to a particular addition fact (subtraction fact).

- You may wish to use the fifteen number sentences at the right for a timed test.

LESSON OUTCOME

Select the coins needed to buy two items worth not more than 12 cents

Materials

real money, play money, or coin cutouts from copies of page T337, items marked with prices from 1¢ to 9¢, cards marked with amounts from 1¢ to 12¢

RELATED ACTIVITIES

- You may wish to extend the work on the page by involving the children in the play store.
- If the children are able, have them write the prices of three toys that together cost a given amount, say, 9¢, 10¢, or 11¢. Challenge the children to find how many different sets of toys they can buy for one amount, say, 12 cents. Note that more than one of a kind may be chosen, for example, 5¢, 5¢, 2¢, or 4¢, 4¢, 4¢, or 8¢, 2¢, 2¢, or 4¢, 2¢, 2¢, 2¢, 2¢, and so on.

Buy. 4¢ 8¢ 2¢ 9¢ 5¢ 3¢

yo-yo crayon 12¢

sailboat beach ball 11¢

megaphone yo-yo 9¢

beach ball hat 12¢

crayon sailboat 10¢

Buying two items for not more than 12 cents

(two hundred forty-one) 241

LESSON ACTIVITY

Before Using the Page

- Display sets of coins containing various combinations of quarters, dimes, nickels, and pennies (values to 50 cents). Have children count to determine the value of each set.
- Display a set of coins at random. Have a child place the coins in order of value from greatest to least and find the value of the set of coins. Repeat with other sets of coins.
- Display a number of items with tags showing prices from 1¢ to 9¢. Ask a child to choose two of the items and to state how many cents are needed to pay for both items. Ask another child to select coins that can be used to pay for the two items. Continue this activity by giving each child a set of coins (one dime, one nickel, four pennies) and having them select the coins needed to pay for two items.

Give each child a card showing how much money can be spent (from 1¢ to 12¢). Have each child name two items that could be bought for 8¢, for example. Have other children discover that two different items could also be bought for 8¢, for

example, items worth 3¢ and 5¢, 2¢ and 6¢, 4¢ and 4¢, 1¢ and 7¢. In each case, have children show the coins that would be used.

Using the Page

- Discuss the six toys and their prices with the children. Ask what the price of the yo-yo is and what the price of the crayon is. Ask how much the two items together cost. Have the children record the amount and then ring the coins that have a value of 12 cents. Then let the children work independently.
- After the children have completed the page, you may wish to have them solve problems similar to the following:
 - How much more does the first pair of toys cost than the second pair?
 - How much less does the third pair of toys cost than the second pair?
 - Which pairs of toys cost the same amount?
 - In what two ways could you pay for the last pair of toys?

LESSON OUTCOME

Manipulate and match shapes as part of a design

Materials

plastic or cardboard tangram pieces for each child, pictures created from tangram pieces (See page T348.)

Vocabulary

tangram

RELATED ACTIVITIES

- Have the children use the tangram pieces to make a design of their own. They need be limited only by their imaginations. After the designs are made, you may wish to have the children trace around the shapes on sheets of paper. They may color the shapes and include background. The children may enjoy guessing what pictures other children have made by asking, "Is it a house?" "Is it a person?" "Is it a train?"

If you wish to provide designs for the children to work with, four possible designs are given on page T348.



LESSON ACTIVITY

Before Using the Page

- Provide each child with the pieces of the tangram. If you do not have plastic tangrams, use the pattern on page T347 to make cardboard tangram pieces. If you have to make your own tangram pieces, children can cut them out in an activity period prior to the lesson for this page. Let the children experiment with the tangram pieces. Ask questions about the shapes, for example, how they are alike and how they are different. Then display a picture made up of the pieces, for example, the boat on page T348. Have children, in turn, choose a piece and place it over the corresponding shape in the picture.

Place the tangram pieces to form other pictures and have the children place their tangram pieces in the corresponding positions on their desks.

Using the Page

- Discuss the picture made from the tangram pieces. Can the children identify it as a rabbit? Have the children place their tangram pieces in the corresponding positions on the page.

When the children have completed the rabbit, have them form a rabbit beside the rabbit shown on the page. Some children will find this more difficult.

LESSON OUTCOME

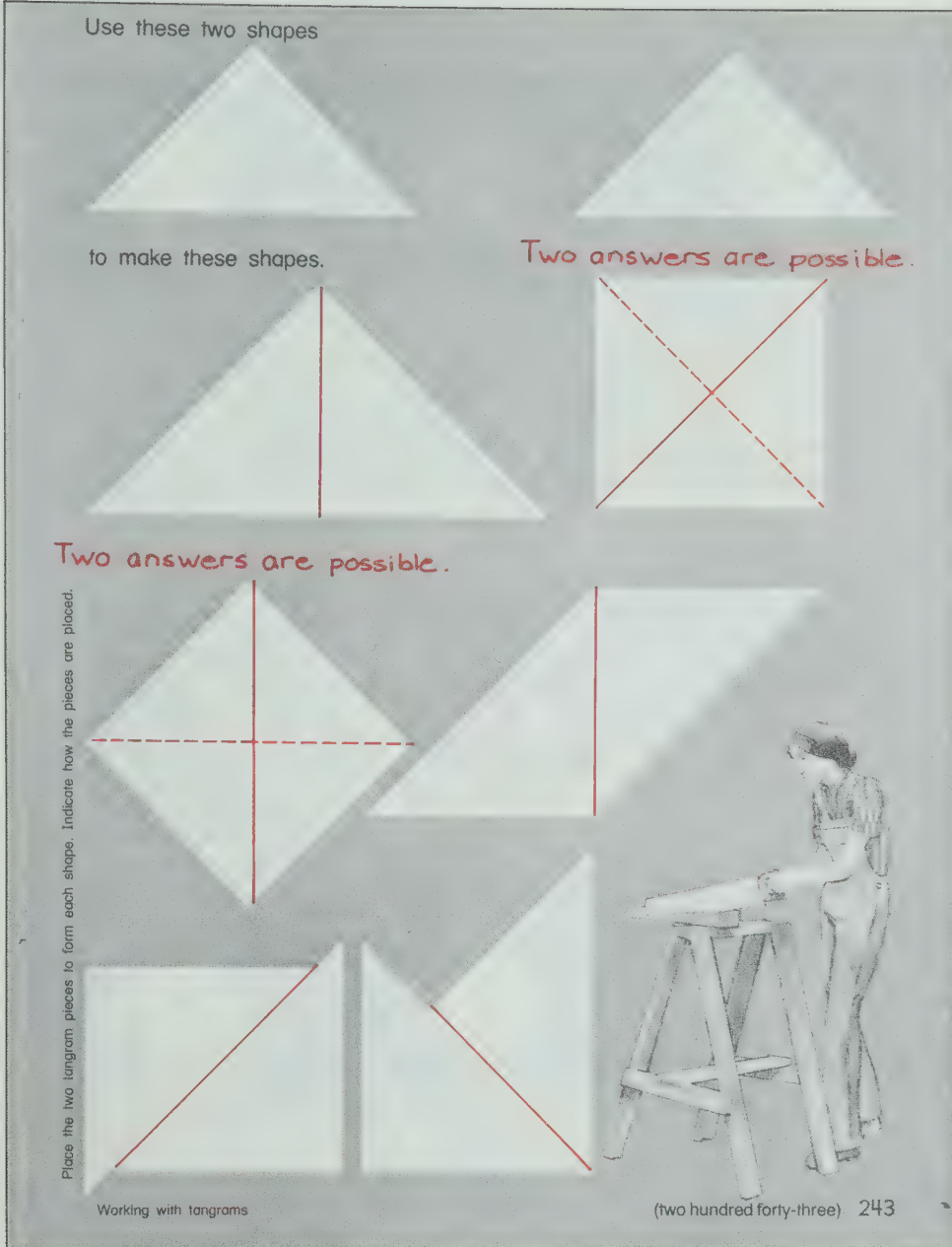
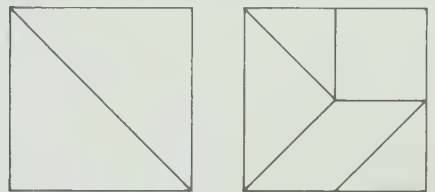
Use models to obtain solutions for problems

Materials

display board, felt tangram pieces, plastic or cardboard tangram pieces for each child

RELATED ACTIVITIES

- To review covering surfaces with square units, you may wish to give children pieces of paper of various sizes. The children can trace around the square tangram piece to find how many they would need to cover their pieces of paper.
- To review equal parts you might have the children discover that each small triangular piece is one-half of the square piece. Similarly, the square piece is one-fourth of the large square shape formed by the two large triangular pieces.
- For a real challenge, have the children try to fit the five small pieces over the two large triangular pieces so that the seven pieces together form two identical square shapes.



LESSON ACTIVITY

Before Using the Page

- If you have tangram pieces cut from felt, make a picture on the display board for the children to identify and reproduce using their own tangram pieces. Repeat several times if you wish.
- Have the children follow instructions such as the following:
 1. Choose the two large triangular pieces. Place them to form
 - (a) a square shape,
 - (b) a large triangular shape.
 2. Choose the two small triangular pieces and the square piece. Place them to form
 - (a) a rectangular shape,
 - (b) a large triangular shape.

Create other problems for the children to solve, using two or more pieces.

Using the Page

- Read the instruction to the children. Have them identify the two tangram pieces to be used for the problems. Have them

place the two pieces so that they form the large white triangular shape. Have them trace over the dotted line that indicates where the two pieces touch. Let the children continue on their own. While the children work, observe those who have difficulty. These children lack good visual perception and may need to attempt the exercises on several occasions before they are successful.

LESSON OUTCOME

Interpret time, to the half-hour

Materials

demonstration clock, real clock, crayons for each child

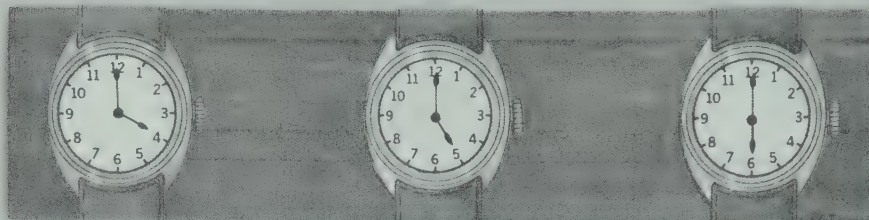
Vocabulary

half-past, minutes

RELATED ACTIVITIES

- Prepare cards showing different times, to the hour and to the half-hour, from 9:00 to 4:00. Have children place the cards in order; that is, 10:30 will come before 12:30, and 1:30 will come before 2:00. You may wish to use copies of page T339 for this activity.

What time is it?



4 o'clock

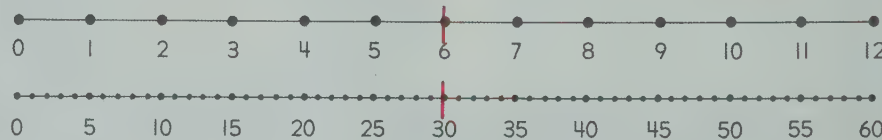
4:00

5 o'clock

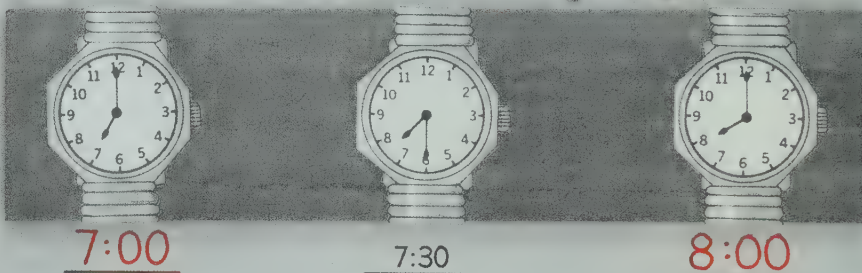
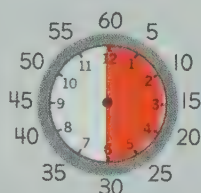
5:00

6 o'clock

6:00



Color one half.



244 (two hundred forty-four)

Introduction to the half-hour

LESSON ACTIVITY

Before Using the Page

- Show 9 o'clock on the demonstration clock. Ask what time it is, where the short hand points and what it tells, and where the long hand points. Write "9 o'clock" on the chalkboard. Tell the children that there is another way to show "9 o'clock". Write "9:00" on the chalkboard. Repeat for other times, to the hour.
- Set a real clock at 2 o'clock. Ask the children what time is shown. While the children watch, reset the clock to show 3 o'clock. Point out that the long hand went all the way round the clock. Ask where the long hand would be if it went only half way round the clock (6). Reset the clock to show half-past two. Ask the children to describe the position of the short hand (halfway between 2 and 3). Say that the time is "half-past two". Move the hands on the clock to show different times, to the half hour.
- Display a clock face that has marks for minutes indicated. Have children count the number of spaces marked between 1

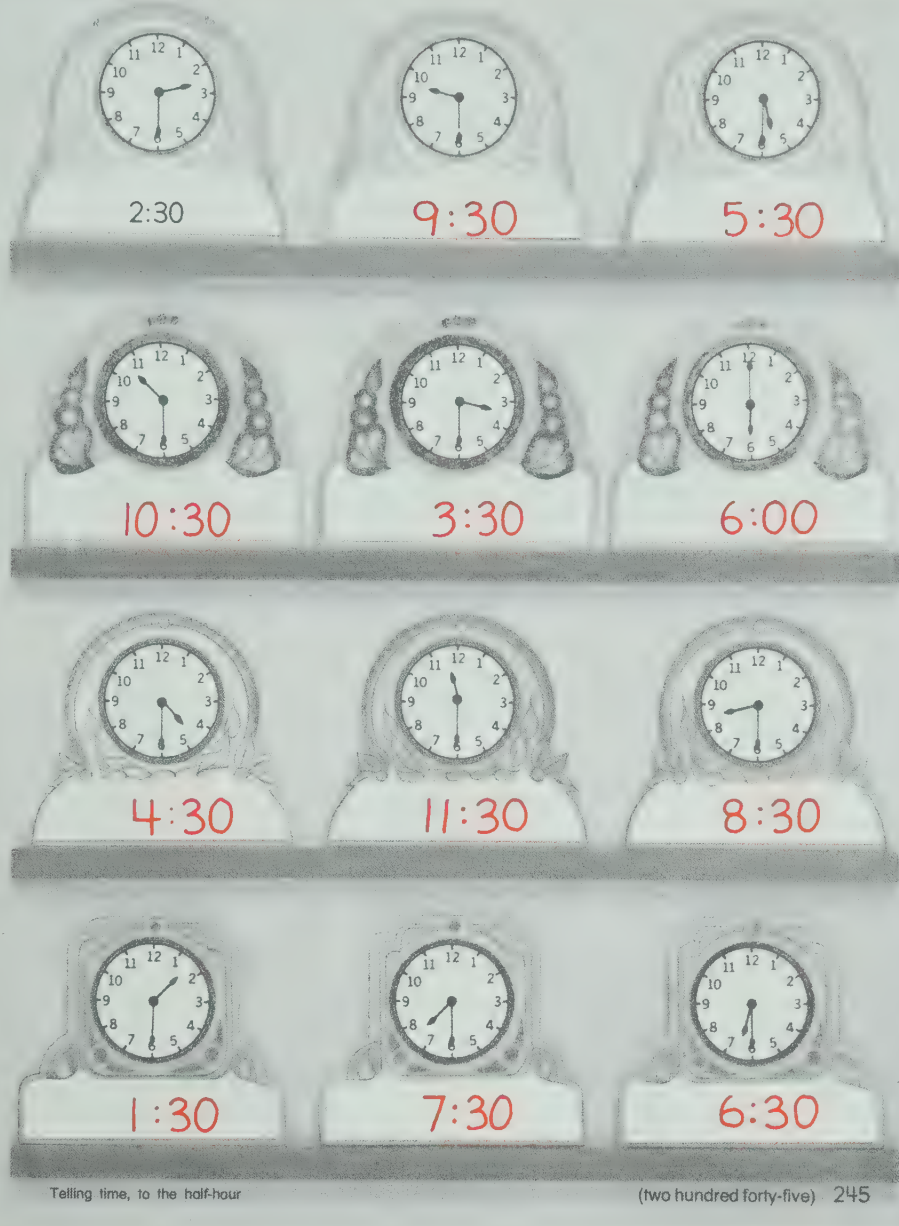
and 2, 2 and 3, and so on. Have them count by fives all the way round the clock. Ask how many spaces there are. Mention that there are 60 minutes in one hour. Have children count by fives halfway round the clock. Ask what number (30) corresponds to 6.

Reset the clock to show half-past nine. Ask what time is shown. Ask the children how they know it is half-past nine. Ask, "When you count by fives on the clock, what number corresponds to 6?" Write "9:30" on the chalkboard. Have children read it first as "half-past nine" and then as "nine thirty". Use other similar examples.

Using the Page

- Have the children use the new form for recording the time shown on each of the three watches at the top of the page.
- Have the children mark into two equal parts the number line from 0 to 12 and then the number line from 0 to 60. Have the children color one-half of the clock face at the left, print the missing numerals for the clock face at the right, and then complete the page.

What time is it ?



Telling time, to the half-hour

(two hundred forty-five) 245

LESSON OUTCOME

Read and record time, to the half-hour

Materials

demonstration clock, a paper plate clock face for each child

RELATED ACTIVITIES

- Prepare a set of cards showing times, to the hour and to the half-hour. For each card, have children state a time one-half hour later and show the time on their clock faces and / or record the time on paper. The cards should show time in the different forms, for example, five o'clock, 4 o'clock, 3:00, half-past six, half-past 8, 7:30, nine thirty.
- Play the game "What's the Time, My Friend?" with the children. Say, "I am thinking of a time when the short hand is between 2 and 3, and the long hand points to 6. What's the time, my friend?" Have the children use their clock faces to help them find the answer. The child who first states the correct answer becomes the leader.

LESSON ACTIVITY

Before Using the Page

- Recite and discuss the following poem with the children.

The clock has a way of speaking
To a child who understands
Although it never says a word
It talks and talks with its hands.

Leland B. Jacobs

- Review some of the activities related to telling time, to the half-hour, suggested in *Before Using the Page* on page T316.

Review telling time, to the hour, and have children record the times on the chalkboard, using the form involving the colon.

Show different times, to the half-hour, on your demonstration clock and ask children to read them. Have a child write each time on the chalkboard, using the form involving the colon.

- Set your demonstration clock at 10:30. Have children read it and then show that time on their own clock faces.

State a time, to the half-hour, and have the children show that time on their clock faces. Repeat several times.

Using the Page

- Have the children write the time shown on each clock face. After the children have completed the page, have them read each time and associate some of the times with happenings at school and at home, for example, what happens at 9:30 in the morning or at 3:30 in the afternoon.

OBJECTIVE

Demonstrate an understanding of concepts presented in this unit

Materials

calendar for the current month, items marked with prices from 1¢ to 9¢, demonstration clock

RELATED ACTIVITIES

- Check the children's work carefully to determine what reteaching is necessary and assign practice exercises as required.

Complete.

$$6 + 2 = \underline{8}$$

$$5 + 5 = \underline{10}$$

$$8¢ + 3¢ = \underline{11}¢$$

$$\begin{array}{r} 10 \\ + 2 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 3 \\ + 6 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 7 \\ + 4 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 4 \\ + 7 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 9 \\ + 0 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 2 \\ + 8 \\ \hline 10 \end{array}$$

$$10 - 3 = \underline{7}$$

$$8 - 5 = \underline{3}$$

$$9 - 8 = \underline{1}$$

$$\begin{array}{r} 11 \\ - 6 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 12 \\ - 8 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 9 \\ - 4 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 6 \\ - 6 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 11 \\ - 8 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 12 \\ - 5 \\ \hline 7 \end{array}$$

What day comes after Monday?

Sunday
Tuesday
Wednesday

What day comes before Thursday?

Tuesday
Friday
Wednesday

What time is it?



9:00

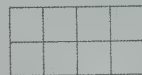


3:30

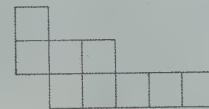


12:30

How many squares?

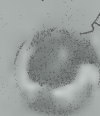


8



9

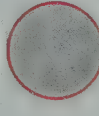
Buy.



and



11¢



246 (two hundred forty-six)

CHECKUP

LESSON ACTIVITY

Before Using the Page

- Review some of the concepts presented in this unit by using one or more of the following activities.
1. Ask questions about the days of the week, their names, and the order in which they come. Have children look at the calendar and state the date that is one or two days after a given date and before a given date.
 2. Review addition and subtraction facts having sums and minuends to 12 by asking questions similar to the following about the calendar for the current month:
 - “How many Wednesdays and Thursdays are there in this month?”
 - “How many more Wednesdays and Thursdays are there than Saturdays and Sundays?”
 - “What date is five days after the sixth day of the month?”
 - “What date is four days before the ninth day of the month?”

Continue the review of addition and subtraction facts by

having children state all the facts related to $9 + 2$, $6 + 6$, $11 - 4$, and so on.

3. Have the children use shapes of various sizes to cover surfaces and count how many shapes are needed to cover each.
4. Display various combinations of a dime, a nickel, and four pennies. Have the children state the value in cents of each set of coins.
5. Display two items with tags showing prices from 1¢ to 9¢. Ask a child to state how many cents are needed to pay for both. Repeat several times. (The value of the two items together should not be greater than 12 cents.)
6. Review telling time, to the hour and to the half-hour, by having the children read clock faces, set the hands on clock faces to indicate certain times, and record times.

Using the Page

- Direct the children's attention to the word *Checkup* at the bottom of the page. Review the purpose of this page. Read and discuss each instruction with the children to ensure that they know what they are to do for each set of exercises. Observe the children as they work and note those who are having difficulty.

Complete.

X	○	✓	X	○	✓	X	○	✓
6	7	8	<u>9</u>	<u>10</u>	<u>11</u>	12	<u>13</u>	<u>14</u>
36	37	38	<u>39</u>	<u>40</u>	<u>41</u>	42	<u>43</u>	<u>44</u>
2	4	6	<u>8</u>	<u>10</u>	<u>12</u>	14	<u>16</u>	<u>18</u>
10	20	<u>30</u>	40	<u>50</u>	<u>60</u>	<u>70</u>	80	<u>90</u>

Match.

4	three
7	four
3	five
5	seven

9	eight
2	six
6	nine
8	two

What number comes before ?

<u>7</u> 8	<u>34</u> 35	<u>49</u> 50
------------	--------------	--------------

What number comes after ?

4 <u>5</u>	35 <u>36</u>	69 <u>70</u>
------------	--------------	--------------

What number comes between ?

9 <u>10</u> 11	18 <u>19</u> 20	43 <u>44</u> 45
----------------	-----------------	-----------------

Ring.

16	is less than	20	32	is less than	23
	is greater than			is greater than	

Color the eighth car blue. Color the third car red.

								
		red					blue	
YEAR-END CHECKUP		(two hundred forty-seven) 247						

OBJECTIVE

Demonstrate an understanding of concepts presented in this book

Comments

• The exercises on this page and the following three pages are designed to test the children's performance on the material presented in this book. The test may be given over two to four days.

The following objectives are tested on this page and in the order indicated:

1. Recognize and continue a given pattern
2. Count and order numbers to 99
3. Count by twos to 20
4. Count by tens from 10 to 90
5. Match the numeral and the word for a number to nine
6. Identify numbers before, after, and between whole numbers to 99
7. Identify which of two numbers is greater than (less than) the other
8. Understand ordinal number concepts from *first* to *ninth*

OBJECTIVE

Demonstrate an understanding of concepts presented in this book

Complete.

$1 + 3 = \underline{4}$	$\begin{array}{r} 2 \\ +2 \\ \hline 4 \end{array}$	$\begin{array}{r} 1 \\ +4 \\ \hline 5 \end{array}$
$3 + 2 = \underline{5}$	$\begin{array}{r} 5 \\ +3 \\ \hline 8 \end{array}$	$\begin{array}{r} 7 \\ +2 \\ \hline 9 \end{array}$
$0 + 3 = \underline{3}$	$\begin{array}{r} 6 \\ +1 \\ \hline 7 \end{array}$	$\begin{array}{r} 2 \\ +8 \\ \hline 10 \end{array}$
$4 + 2 = \underline{6}$	$\begin{array}{r} 0 \\ +9 \\ \hline 9 \end{array}$	$\begin{array}{r} 4\text{¢} \\ +4\text{¢} \\ \hline 8\text{¢} \end{array}$
$5 + 0 = \underline{5}$		
$3 + 4 = \underline{7}$		
$8 + 1 = \underline{9}$		
$4 + 6 = \underline{10}$		
$5\text{¢} + 2\text{¢} = \underline{7}\text{¢}$		

$3 - 2 = \underline{1}$	$\begin{array}{r} 6 \\ -5 \\ \hline 1 \end{array}$	$\begin{array}{r} 3 \\ -1 \\ \hline 2 \end{array}$
$4 - 0 = \underline{4}$	$\begin{array}{r} 9 \\ -5 \\ \hline 4 \end{array}$	$\begin{array}{r} 8 \\ -2 \\ \hline 6 \end{array}$
$5 - 3 = \underline{2}$	$\begin{array}{r} 10 \\ -7 \\ \hline 3 \end{array}$	$\begin{array}{r} 8 \\ -0 \\ \hline 8 \end{array}$
$6 - 3 = \underline{3}$	$\begin{array}{r} 6 \\ -4 \\ \hline 2 \end{array}$	$\begin{array}{r} 10\text{¢} \\ -5\text{¢} \\ \hline 5\text{¢} \end{array}$
$7 - 5 = \underline{2}$		
$10 - 4 = \underline{6}$		
$9 - 6 = \underline{3}$		
$8\text{¢} - 7\text{¢} = \underline{1}\text{¢}$		

$1 + 2 + 3 = \underline{6}$

$4 + 1 + 2 = \underline{7}$

$\begin{array}{r} 2 \\ 2 \\ +2 \\ \hline 6 \end{array}$	$\begin{array}{r} 3 \\ 3 \\ +3 \\ \hline 9 \end{array}$
---	---

$3 + 3 + 2 = \underline{8}$

$5 + 0 + 4 = \underline{9}$

Write the related facts.



$5 + 3 = 8$

$8 - 3 = 5$

$3 + 5 = 8$

$8 - 5 = 3$

Complete.

$\begin{array}{r} 3 \\ +8 \\ \hline 11 \end{array}$

$\begin{array}{r} 6 \\ +6 \\ \hline 12 \end{array}$

$7 + 5 = \underline{12}$

$5 + 6 = \underline{11}$

$\begin{array}{r} 11 \\ -7 \\ \hline 4 \end{array}$

$\begin{array}{r} 12 \\ -9 \\ \hline 3 \end{array}$

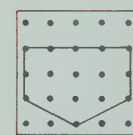
$12 - 4 = \underline{8}$

$11 - 2 = \underline{9}$

How many?



sides	$\underline{3}$
corners	$\underline{3}$



sides	$\underline{5}$
corners	$\underline{5}$

248 (two hundred forty-eight)

YEAR-END CHECKUP

Comments

- This is the second of the four pages for the *Year-End Checkup*. (See page T319.)

The following objectives are tested on this page and in the order indicated:

- Complete basic addition facts, sums to 10
- Complete basic subtraction facts, minuends to 10
- Add three numbers, sums to 10
- Write related basic addition and subtraction facts, sums to 10
- Complete basic addition and subtraction facts, sums and minuends of 11 and 12
- Count the sides and the corners of a geometric shape

OBJECTIVE

Demonstrate an understanding of concepts presented in this book

Complete.

1 dime and 6 pennies = 16¢

1 ten 6 ones = 16

4 tens 0 ones = 40


6 tens 7 ones = 67

24¢ = 2 dimes and 4 pennies

31 = 3 tens 1 one

76 = 7 tens 6 ones

92 = 9 tens 2 ones

I have 3  's.


Pat has 3  's.


How many  's in all?

$$3 + 3 = 6$$

6

 's


I have 6  's.

Pat has 4  's.

How many more have I?


$$6 - 4 = 2$$

2

 's

4  's

3 more  's came.

How many  's in all?

$$4 + 3 = 7$$

7

 's

8  's

2  's went away.

How many  's were left?

$$8 - 2 = 6$$

6

 's

YEAR-END CHECKUP

(two hundred forty-nine) 249

Comments

- This is the third of the four pages for the *Year-End Checkup*. (See page T319.)

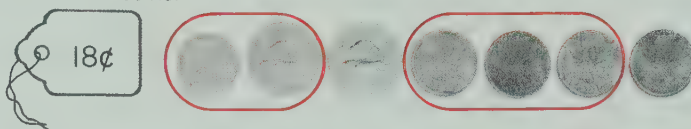
The following objectives are tested on this page and in the order indicated:

1. Write the standard two-place numeral for a number of tens and a number of ones
2. Interpret a two-digit number as a number of tens and a number of ones
3. Write a number sentence for a story problem and answer the question of the problem

OBJECTIVE

Demonstrate an understanding of concepts presented in this book

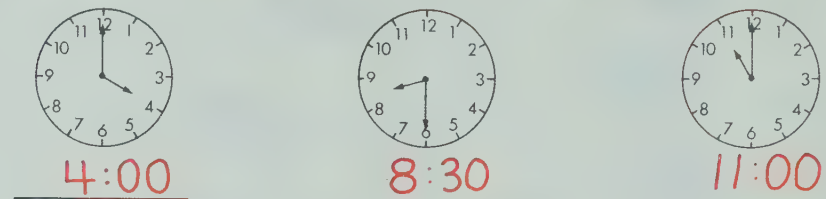
Mark the coins.



How much?



What time is it?



Ring one half. Use a \checkmark to show one fourth.



Color one half of each set.



Measure. Use a



Ring.



250 (two hundred fifty)

YEAR-END CHECKUP

Comments

- This is the last of the four pages for the *Year-End Checkup*. (See page T319.)

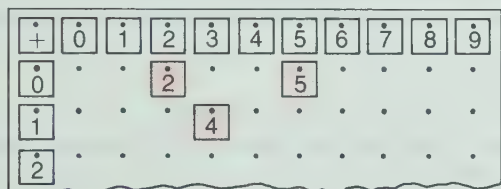
The following objectives are tested on this page and in the order indicated:

- Identify the coins needed for a given amount of money
- Count by fives to determine the value of a given set of nickels
- Read and record time, to the hour and to the half-hour
- Identify one-half and one-fourth of an object or a shape
- Identify one-half of a set
- Measure length using a non-standard unit
- Compare the length of an object with the length of a metre stick

Extra Materials

Pages T324 to T348 include materials that have been referred to in the teaching suggestions for various lessons. Although suggestions for using many of these materials are given in the related lesson outlines, other suggestions for some of the materials are given below.

The number board described on page T325 may be used in conjunction with the number chart on page T343. Children can ring the numbers in a row, column, or diagonal and observe the pattern. When adapted to show an addition table, the number board may be used in conjunction with the table on page T344. Tags of one color are used for addends and a different color, for sums. Children can hang the tags for sums on the appropriate hooks and observe patterns. The completed table may be displayed for several days. From time to time, a few tags may be removed to encourage the children to memorize the facts.



Certain materials for tens and ones are suitable for display on the number board. For example, record centres or metal-rimmed tags, whether single or bundled into tens and tied with pipe cleaners or string, are easily displayed.

The shapes on pages T327 and T328 may be used for making attribute blocks (see page xxxi) since the actual size is shown. These shapes also lend themselves for work with fractions since their dimensions are such that four of one small shape exactly cover the corresponding large shape (with the exception of the circles). The large circle is of a suitable size for making individual number spinners.

The patterns for the three-dimensional shapes on pages T329 and T330 are marked with recommended dimensions. You may find it easier to construct these shapes if each pattern is outlined first on squared paper (page T342), using the centimetre grid lines as a guide.

Several patterns for geopaper are provided. The 9-point pattern on page T331 is recommended for preparing geopaper to match the geoboards shown on pages 7 and 35; the 16-point pattern may be used for preparing geopaper to match the geoboards shown on page 60. The 25-point pattern on page T332 may be used for preparing geopaper to match the geoboards shown on pages 123, 140, 141, 161, and 162. If such geoboards are not available, the pattern may be used to make geoboards as described in the overview for Unit 1 on page T1. The dots of the patterns on pages T333 and T334 are 2 cm and 1 cm apart, respectively. Copies of these pages may be used by children to create patterns. The children may exchange sheets and attempt to continue patterns started by someone else. After children are introduced to the concept of a line segment (page 197), they may practise drawing line segments by using a straight edge to join pairs of dots.



Note that copies of page T336 may be cut, if desired, to provide number lines with points identified (0 to 9 and 0 to 10) or unidentified.

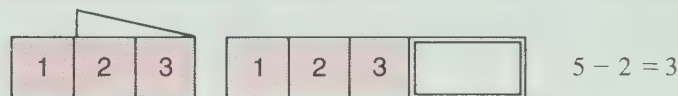
Copies of the coins on page T337 are useful for preparing cards and game boards as described in *Related Activities* on pages T263 and T264.

The tables on page T338 may be used either horizontally or vertically in practising number facts.

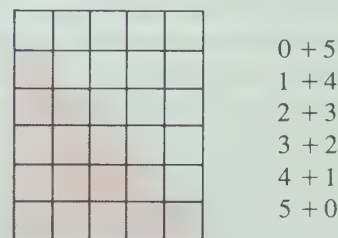
Clock faces marked in hours are given on page T339, and others marked in hours and minutes are given on page T340. Copies of these pages may be cut into strips of either three or four clock faces, depending upon the number of exercises you wish the children to complete.

Copies of page T34I will be suitable for preparing individual game boards or work sheets for activities such as those suggested on pages T83, T95, T106, T120, T156. A class set of domino cards may be prepared by pasting the squared paper on thick cardboard, marking the appropriate dots, laminating the surface (optional), and then cutting the domino pieces apart. Copies of this page will also be suitable for graphing where the children are to color squares for a bar graph. Copies of this page may be cut into strips for the numbers 1 to 10. The strips may be colored so that all the strips for a particular number are the same color. Children can manipulate the strips to illustrate number facts. For example, they can show that the 3 strip and the 5 strip have the same length as the 8 strip, and then write the addition sentence.

If the strips are marked with the numerals, subtraction can be illustrated by bending back the number of units being taken away, or by covering the end of the minuend strip with an inverted strip for the subtrahend.



Sections of squared paper may be used for illustrating number combinations for a given sum. For example, a section of 6 squares by 5 squares could be used for illustrating facts of 5. A copy of page T341 or T342 can be used as a guide when preparing number charts and tables.



The chart on page T346 may be used not only for showing the current month, but also for making weather charts for various months, birthday months of individual children, and records of different activities.

If you wish to demonstrate tangram pictures using an overhead projector, copy the tangrams on page T347 onto a thick sheet of colored acetate, cut the pieces apart, and then reassemble them on the overhead projector to show tangram pictures. For the children's use, the pattern can be pasted onto a sheet of colored Bristol board, laminated, and then cut apart. Although the tangram pictures on page T348 are not of the actual size, it is easy to tell which pieces are used to make up the design.

Games and Activities

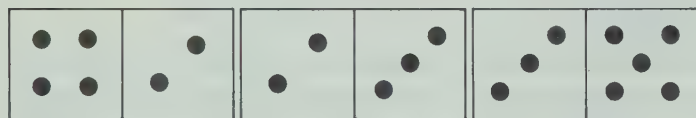
Fox and Rabbit (Game for page 25)

In the gym, have all but two of the children sit so that they form two concentric circles on the floor. One child of the inner circle should be directly in front of a child of the outer circle. These children represent small trees. The two remaining children are to be RABBIT and FOX. FOX is to chase RABBIT through the trees. If FOX catches RABBIT, they change roles. If RABBIT wants to escape from FOX, he/she sits in front of one pair of children to make a group of three children. The child in the outer circle then becomes RABBIT and there are two children left.

Domino Train (Game for page 31)

All the dominoes are arranged face down. Each player draws three of the dominoes. One of the remaining dominoes is turned face up. The first player selects a domino from her/his three that matches either end of the exposed domino. If no two of the dominoes match, a domino is drawn from those that are face down. Then the next player takes a turn. The player who uses all her/his dominoes first is the winner.

If you wish to have the entire class participate, make a class set of dominoes on strips of cardboard 30 cm by 13 cm. Distribute one to each child. Have one child start the domino train by standing the card on the ledge of the chalkboard or placing it on the floor. Ask the children if someone has a card that will “fit” the train at either end. Choose a volunteer to place her/his card beside the first card. Have the children come up in turn and place their cards to form the train. It may be necessary to start a new train if the first train gets too long.



Matching Activity (for page 32)

Provide each child with a chart marked as shown, 15 small counters (beans, beads, pasta pieces, bingo chips) and small cards showing the words *one* to *five* (to fit the width of the headings on each chart). You will need five flash cards, one for each word.

1	2	3	4	5

Display one of the flash cards, for example, *five*. The children find their own card showing *five* and place it over the numeral on the chart. Then they place the correct number of counters below the word in the column. Continue until all the numerals are covered.

If you wish, you may continue by displaying numerals, for example, 3. The children remove the card showing *three* from their charts and the counters in the column below the 3.

Snap (Game for page 38)

Shuffle the cards and deal them into two equal piles for two players. The two players turn up the top cards of their piles at the same time. If the two cards match, the player to call “Snap” first wins both cards. If they do not match, play continues with the two players turning up cards at the same time. Play continues until one player has no cards. The other player is the winner.

The game may be adapted for any number of players who would receive the same number of cards from the pack at the start. It is necessary for only two players’ cards to match in order for any player to call “Snap”.

This game may be played using any two sets of matching cards. For example, you might wish to use cards showing geometric shapes in various sizes and colors to reinforce the children’s recognition of these shapes.

Cover-up (Game for page 42)

For this game you will need a large number strip for the numerals 0 to 5, six markers for each board, and a die marked 0, 1, 2, 3, 4, 5.

The rules for the game are as follows:

1. The die is rolled and the corresponding numeral on the strip is covered.
2. If a number rolled is already covered, the child who plays alone begins again on an empty number strip.
3. If the children play in pairs, the second player takes the die and begins to play on her/his number strip.
4. Play continues back and forth until one player has covered all the numerals and is declared the winner.

Numbers in Order (Game for page 53)

Use four sets of cards showing the numerals 0 to 8. Shuffle the cards and deal five of them to each of four players. Place the remaining cards face down to form a drawing pile. Players take turns drawing one card and discarding one card (face up). A player may draw the top card from the discard pile instead of the drawing pile. The player who first collects five cards showing five consecutive numbers is the winner, for example, 3, 4, 5, 6, 7.

A child may play alone using two sets of cards showing the numerals 0 to 8. The cards are arranged face up in an array of three cards by six cards. Cards that are adjacent in the array and that show consecutive numbers may be removed. Have the child explain the removal of the cards by saying; for example, “Two and one more are three. Three and one more are four.”

Team Up (Game for page 56)

Select the rods for *one* to *eight* from two sets of Cuisenaire rods. Choose two identical containers for the rods. Mark one container with red and the other container with blue. Place one set of rods in each container.

Divide the children into a red team and a blue team. Have a player from the red team draw a rod from the red container. Then have a player from the blue team choose a rod from the blue container that looks as if it will fit with the first rod to make a rod for *nine*. If the two rods together make a rod for *nine*, the blue team keeps the rods. If the two rods together do not make a rod for *nine*, the rods are returned to their contain-

ers. The next turn begins with a player from the blue team drawing a rod from the blue container. The team that wins the most pairs of rods for *nine* wins the game.

Fish (Game for page 59)

Select all the cards for ace, two, three, . . . , nine from a pack of regular playing cards. Shuffle the cards, deal five cards to each of three or more players, and use the remaining cards for a drawing pile.

The leader asks one other player for a card for a particular number to match one in her/his hand. If the player who was asked has a card for that number, the card must be given to the leader. Then the leader may ask any player for another card. If the player who was asked does not have that particular card, he/she indicates this by saying, "Fish." The leader must then take the top card from the drawing pile, and the next player becomes the leader.

A player having four matching cards, places them on the table and scores a point. At the end of the game, the winner is the player with the most points.

Activity for page 64

Have the children work in pairs using three counters. One child shuts her/his eyes while the other child picks up some or all of the counters with one hand and the remaining counters with the other hand. The first child points to one of the hands and is shown the counters in that hand. Then the child determines how many counters must be in the other hand.

The children should repeat the procedure several times for three counters and change roles frequently. When three counters no longer provide a challenge, have the children use four counters, then five, and so on to nine counters.

Numbers and Sums (Game for page 124)

Say, "I am thinking of two numbers whose sum is seven. What are the two numbers?" Ask different children to name pairs of numbers whose sum is seven, until someone mentions the pair that you are thinking of. Let that child become the leader and state the next pair of numbers for a particular sum. Ask each leader to write down the two numbers before stating the riddle.

Activity for page 125

Make cards with addition and subtraction phrases listed at the left and the answers at the right. Staple strips of paper over the answers. Have the children write the sums and differences on the top strip and then pull it off, look underneath the remaining strips, and check their answers.

6 - 4	2
7 + 2	9
5 - 1	4
4 + 3	7
6 - 6	0
3 - 1	2
2 + 5	7
9 - 4	5

Number Board (for page 188)

A board large enough for 121 nails or hooks for hanging tags on is useful for many activities.

0	1	2	3	4	5	6	7	8	9	.
10	11	.	.	.	.	.	.	.	.	.
20	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.

Obtain a piece of plywood that is 60 cm by 60 cm and about 1 cm thick. Place 121 nails (or hooks) at 5 cm intervals in a square array, forming eleven rows with eleven nails in each row. Copies of page T334 may be taped to the board as a guide in placing the nails.

Prepare tags, either circular or square to fit the space available. Punch each tag with a hole for hanging from the nails. Print a numeral on one side of each tag and leave the other side of the tag blank.

This number board may be used to teach counting and recognition of the order of numbers. For example, the tags may be turned with the blank side out and the children may be asked to point to the tag with a certain numeral on it. Then they can check to see whether they are correct by looking at the numeral on the other side of the tag.

Children may practise ordering numbers by taking the tags at random and placing them on the board in their correct positions.

Skip counting may be demonstrated on the board as follows: the numbers that are skipped may have their tags turned with the blank side out and thus only the numbers being counted will show. These numbers may be even numbers or odd numbers, or the numbers starting at zero and counting by fives or tens.

Parking Lot (Game for page 240)

Materials

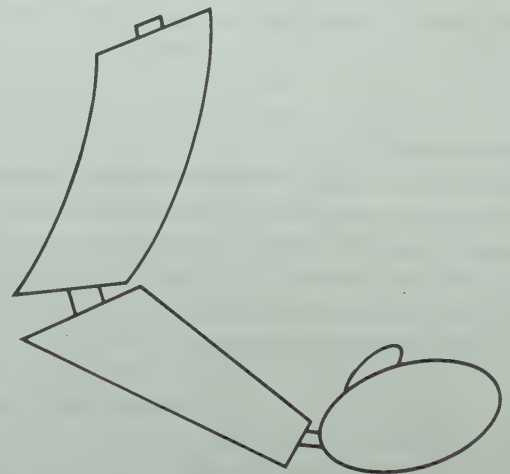
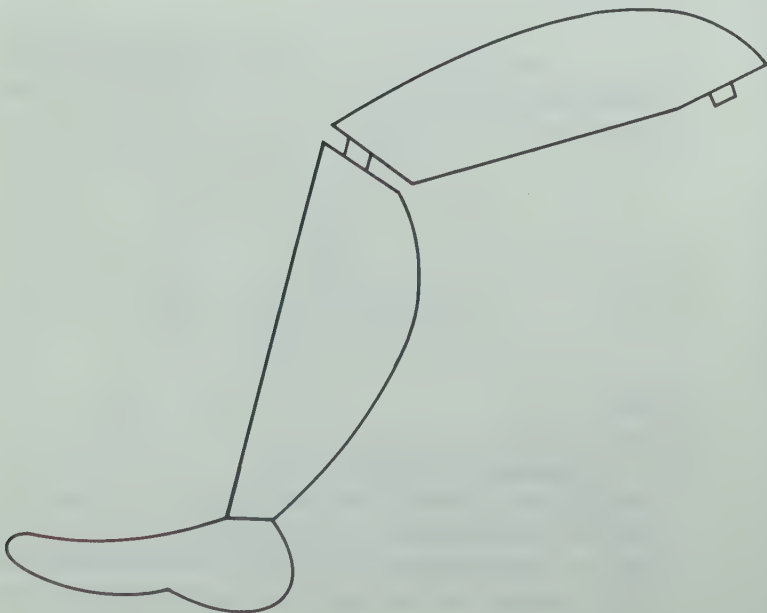
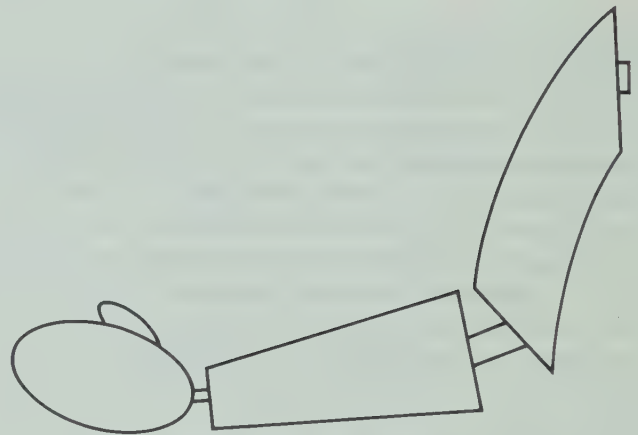
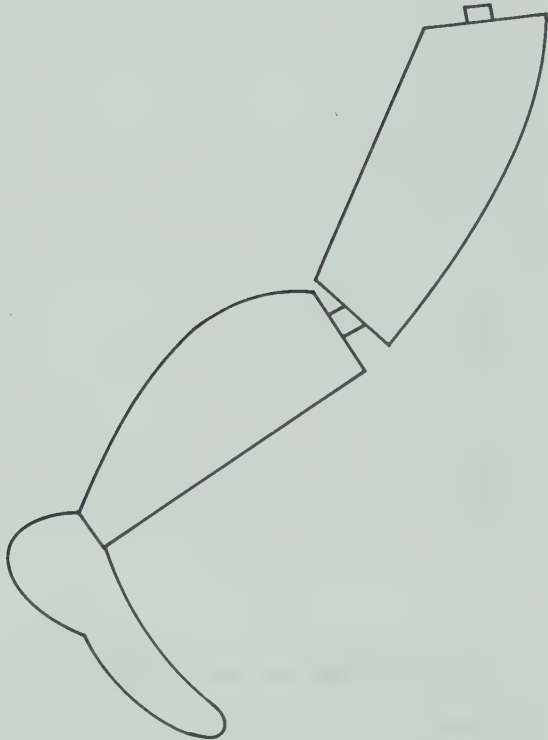
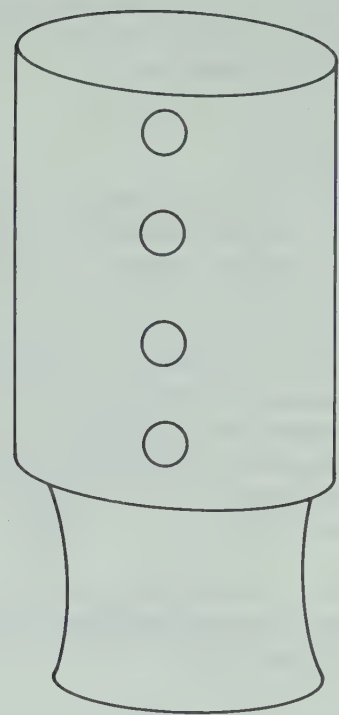
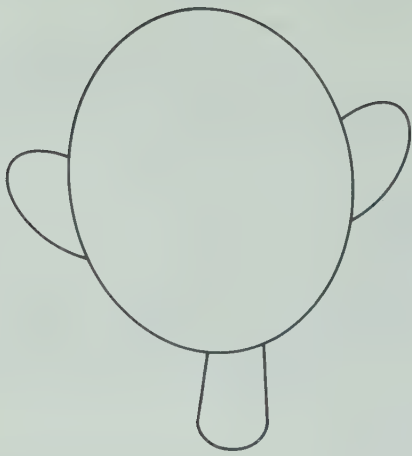
markers to be considered "cars"

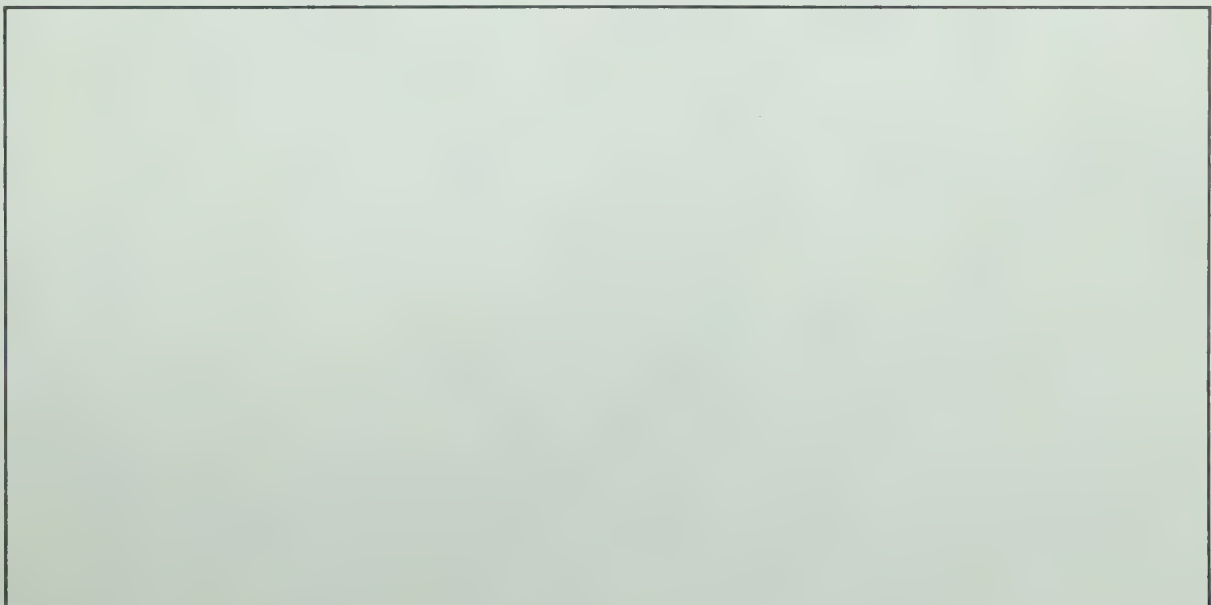
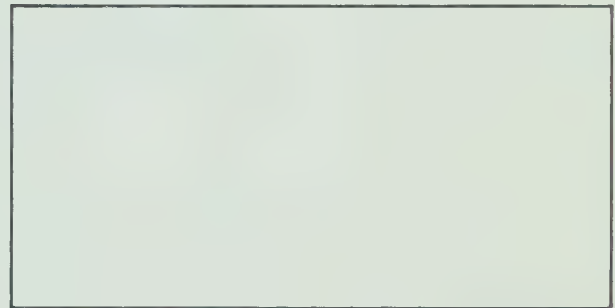
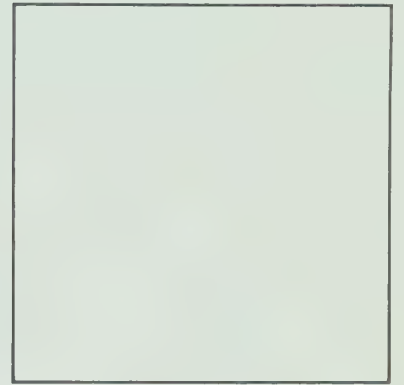
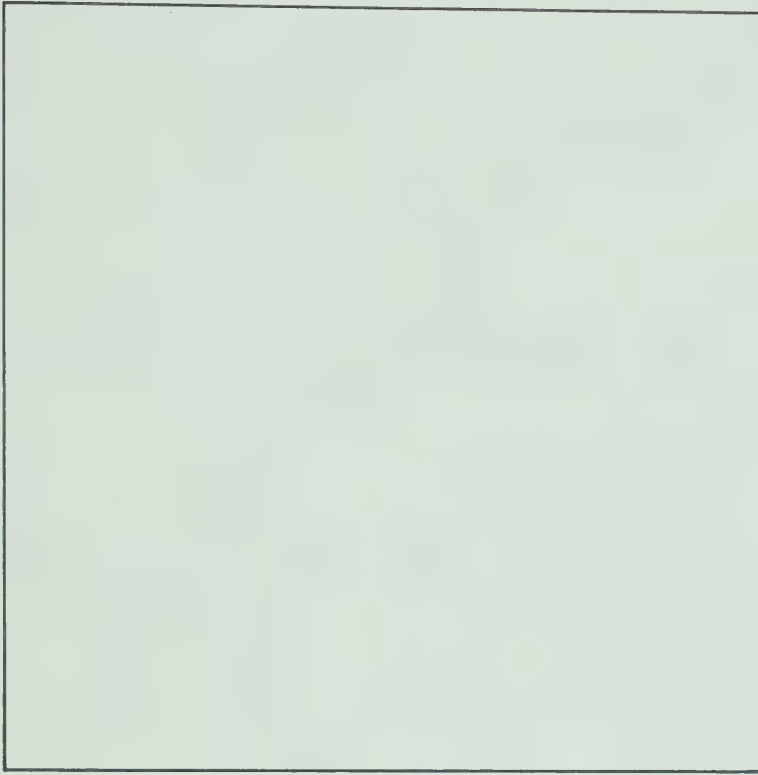
a set of 12 cards having an addition or a subtraction phrase on each; for example, for $3 + 7$ a "car" is "parked" on 10
a game board, similar to the one shown, with parking spaces large enough for the "cars" to "park"

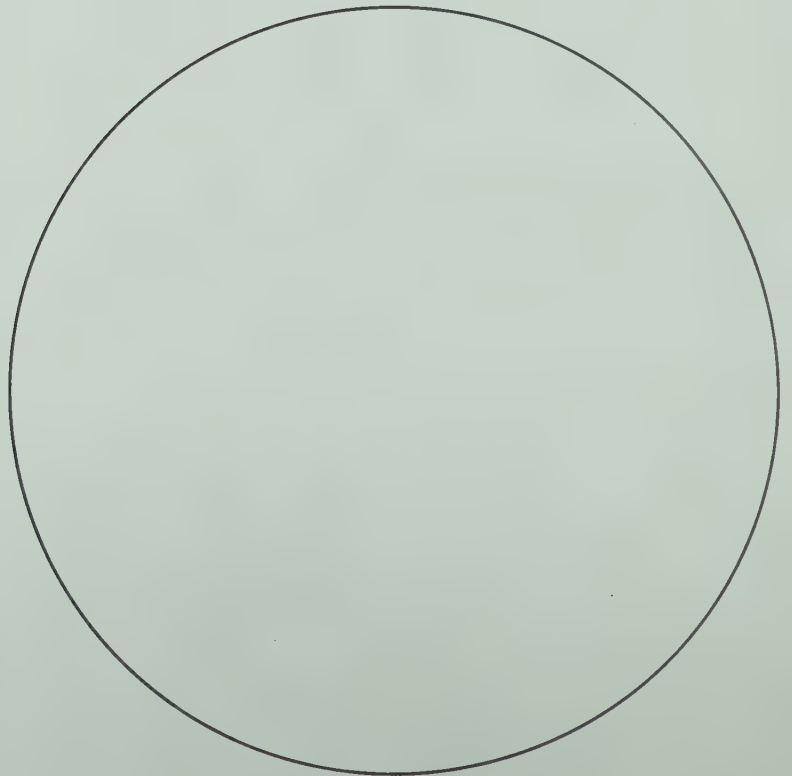
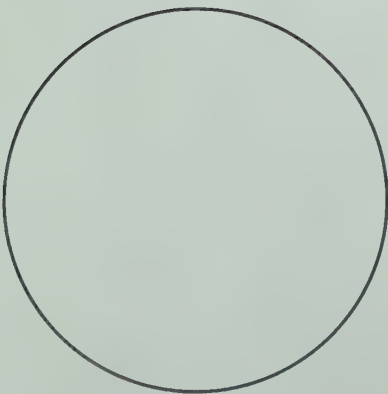
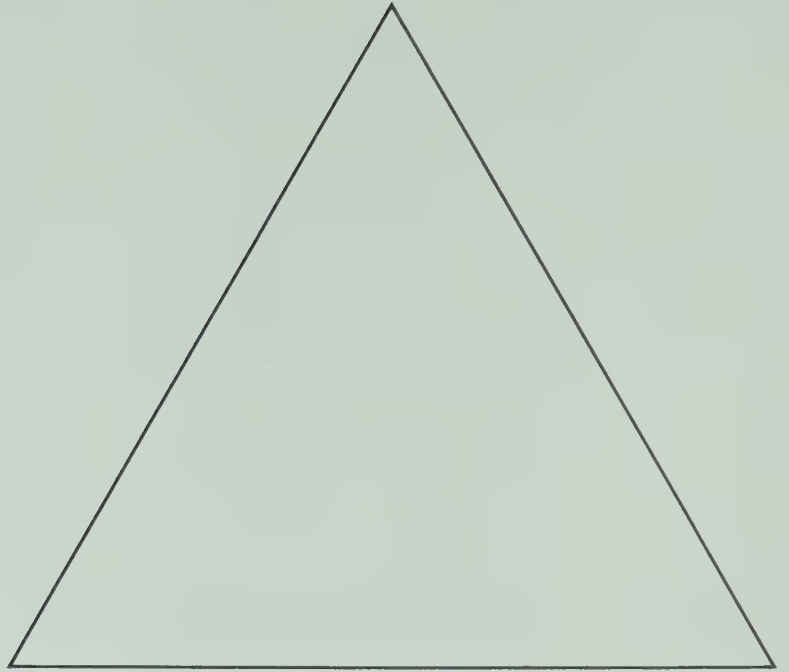
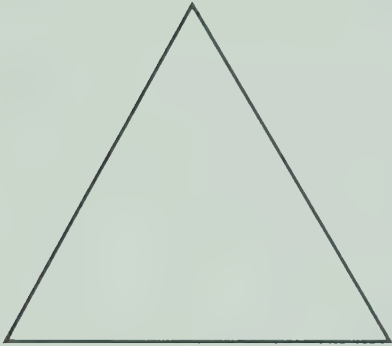
6	1	9	11	7	4
Cards					
2	3	10	12	8	5

Rules

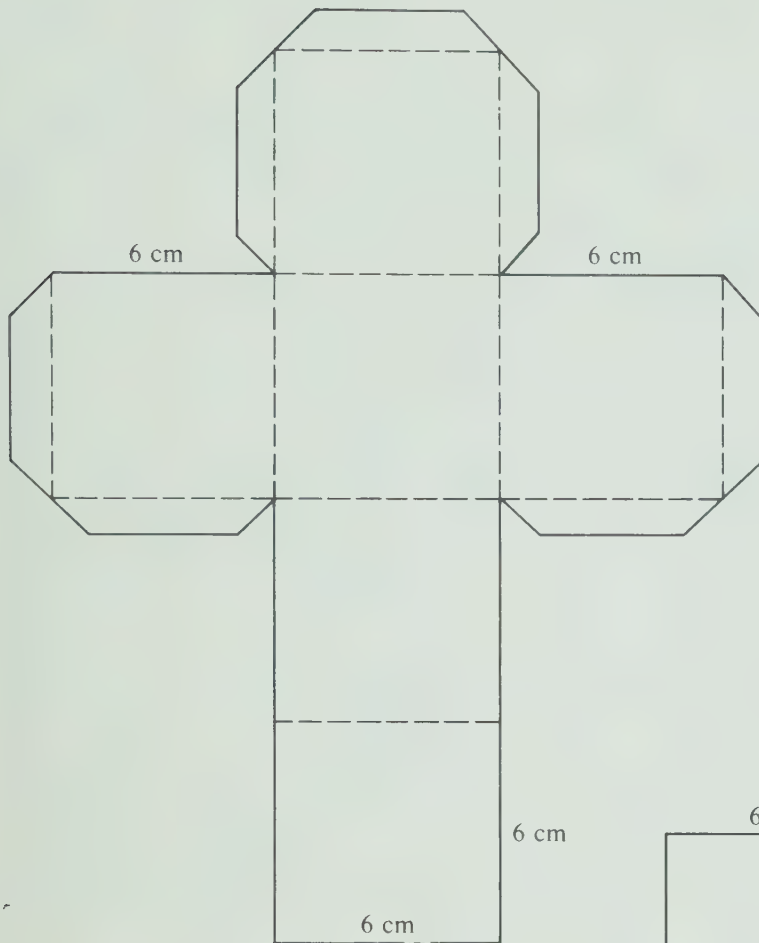
1. Each player chooses a parking lot and six "cars".
2. The first player turns over a card.
3. If the answer appears in her/his parking lot, a "car" may be parked in the space.
4. If the answer does not appear in her/his parking lot, the player cannot play and places the card at the bottom of the pile.
5. The second player turns over a card and the game continues.
6. The player whose parking lot is filled first is the winner.



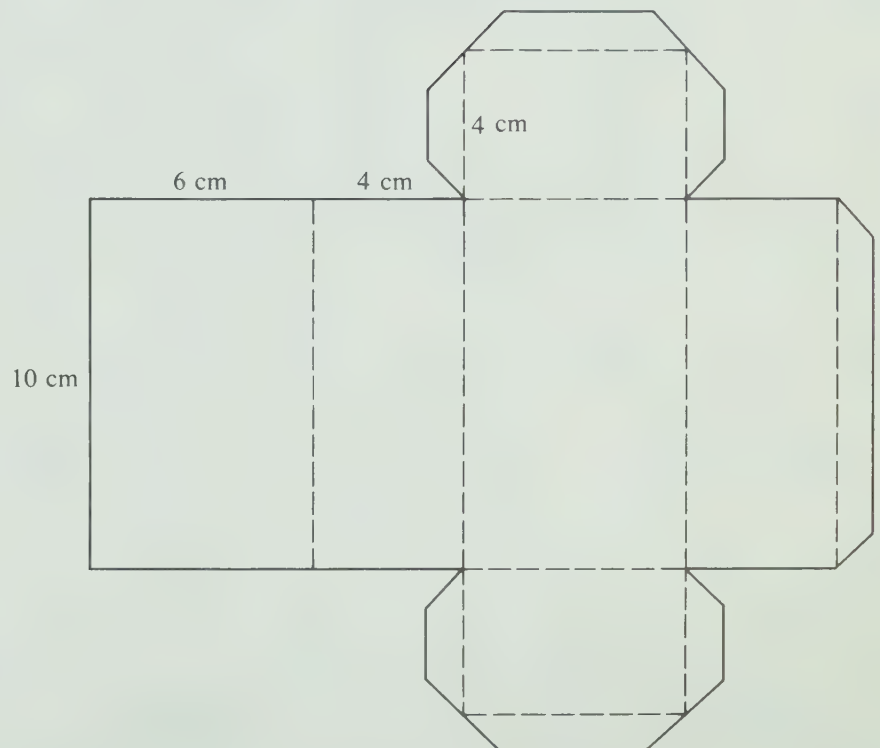




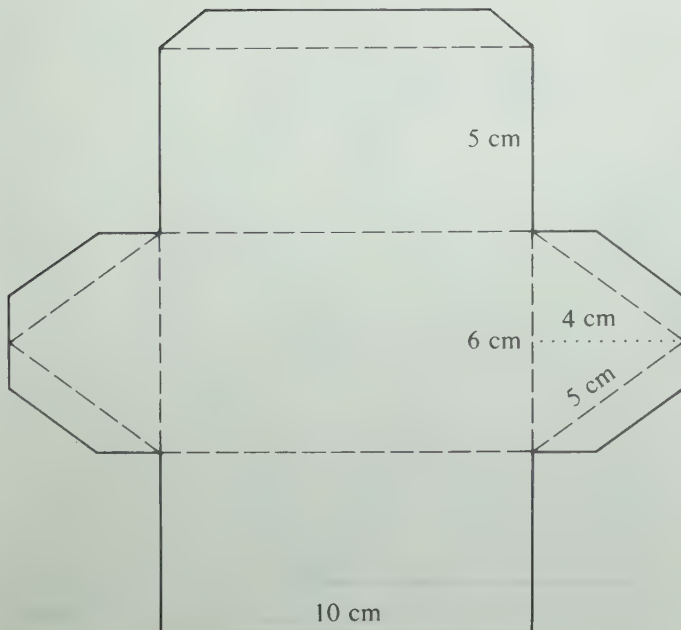
Cube



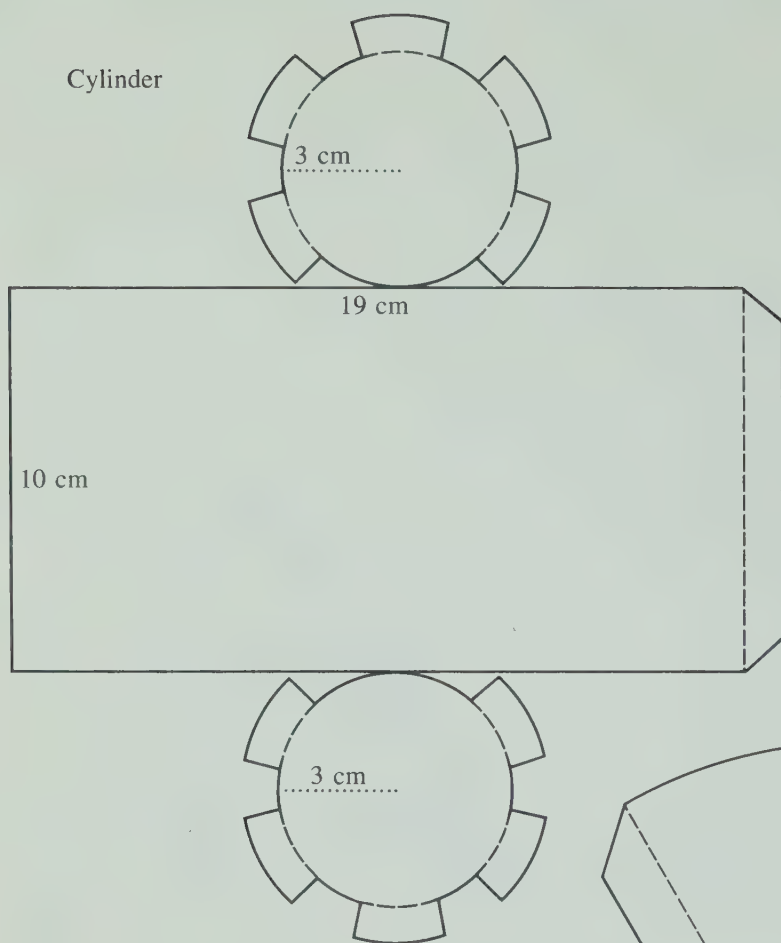
Rectangular Prism



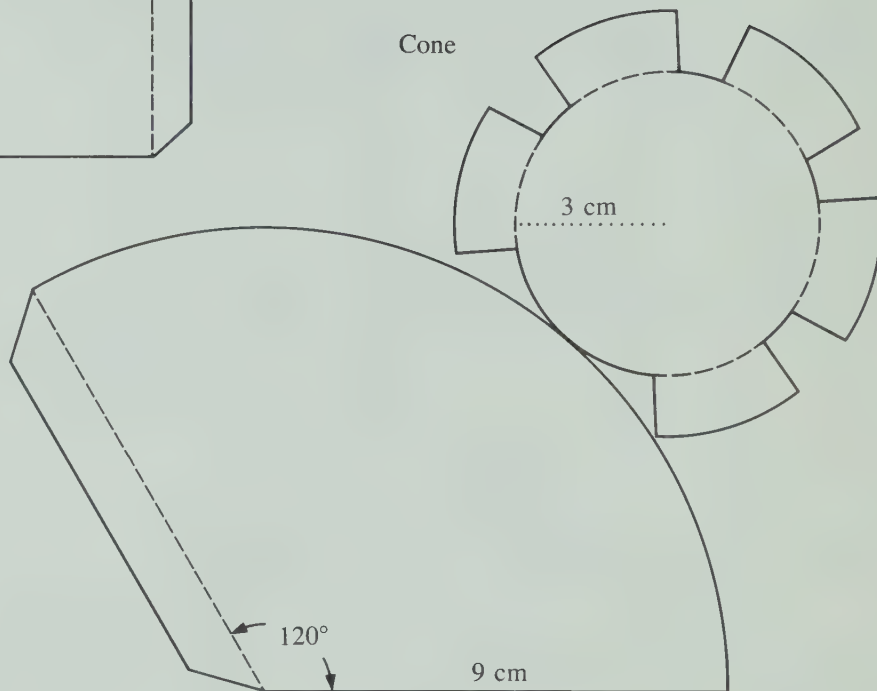
Triangular Prism



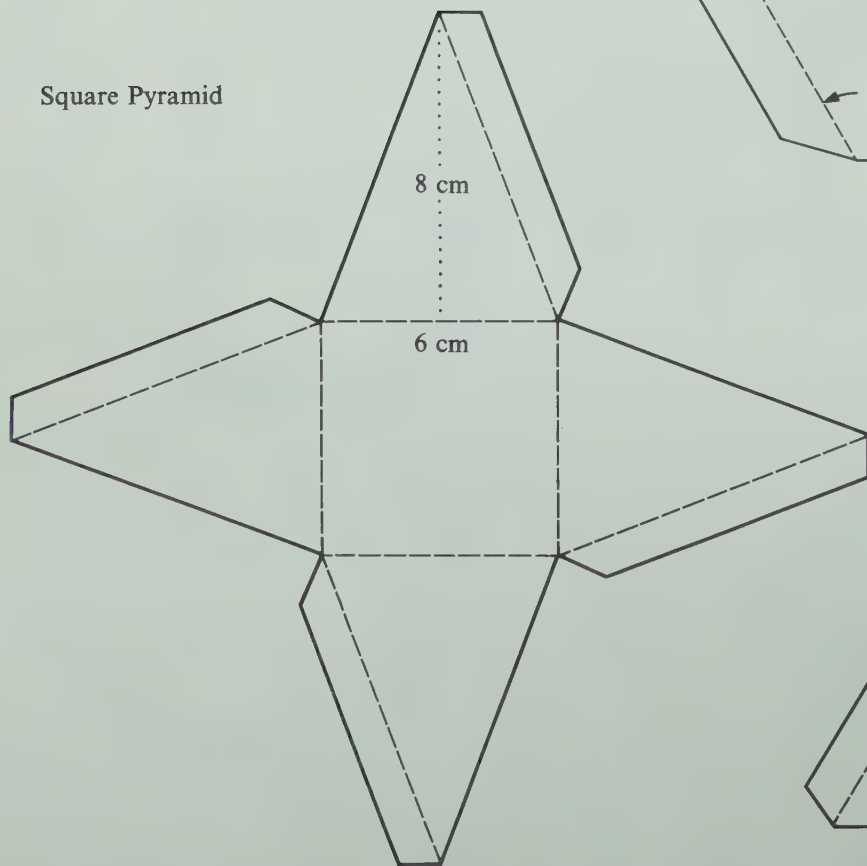
Cylinder



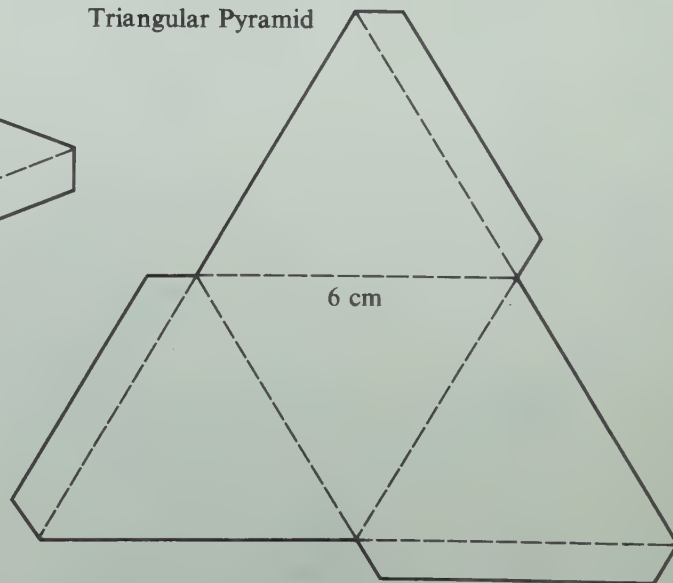
Cone

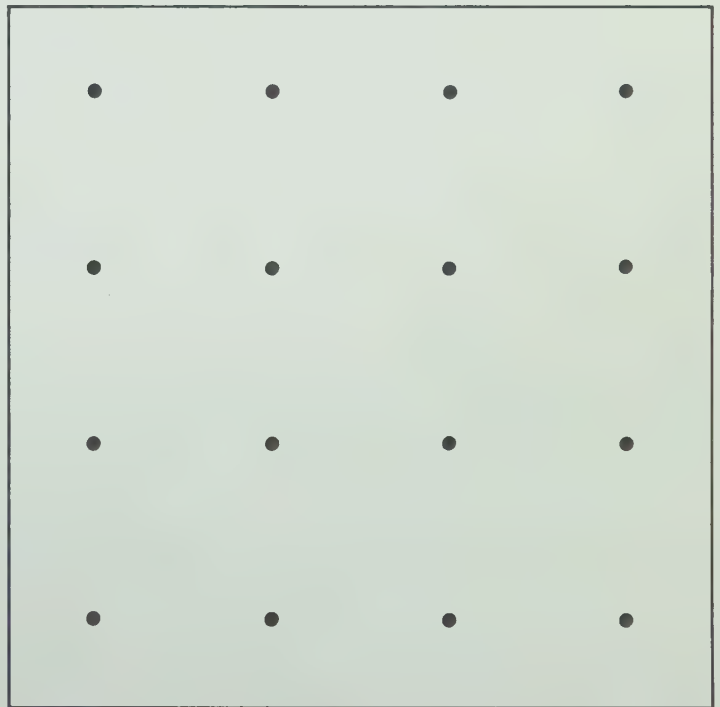
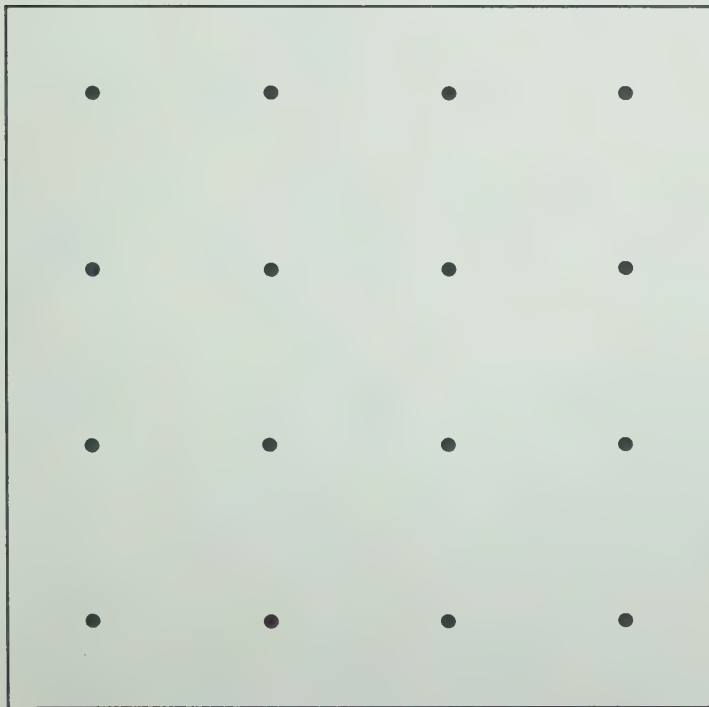
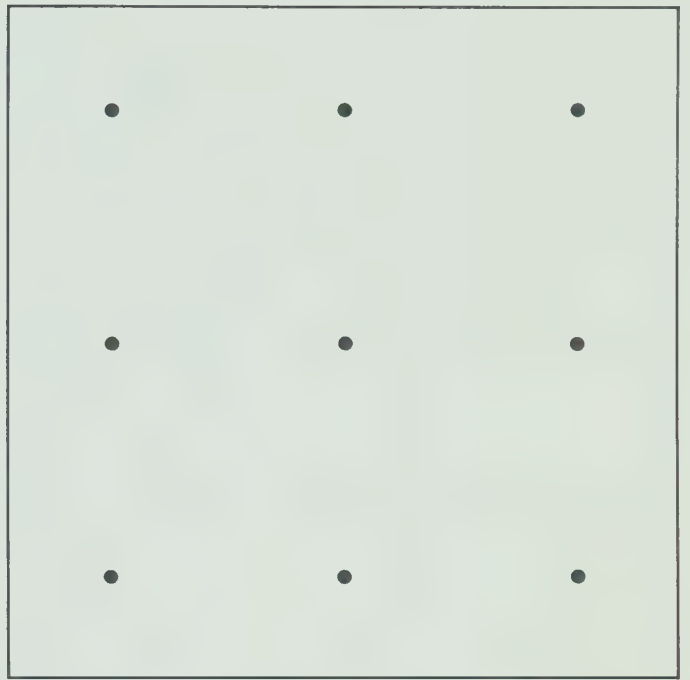
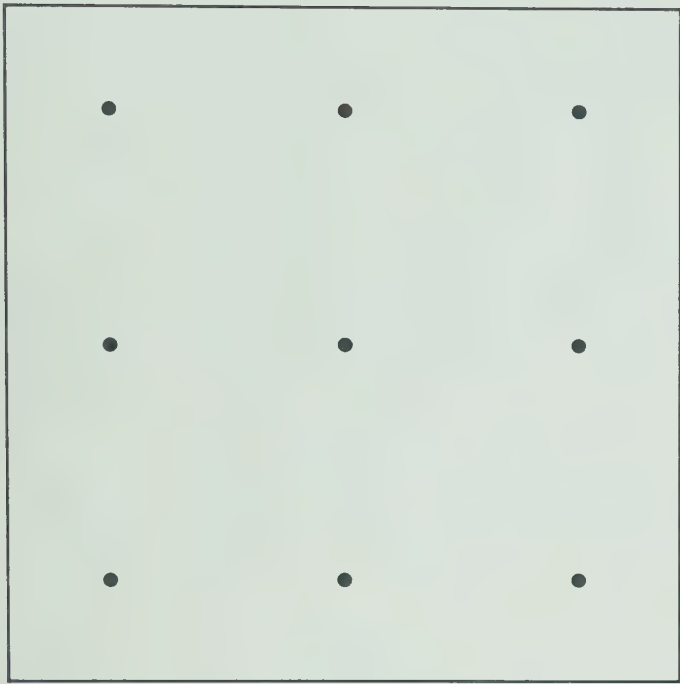


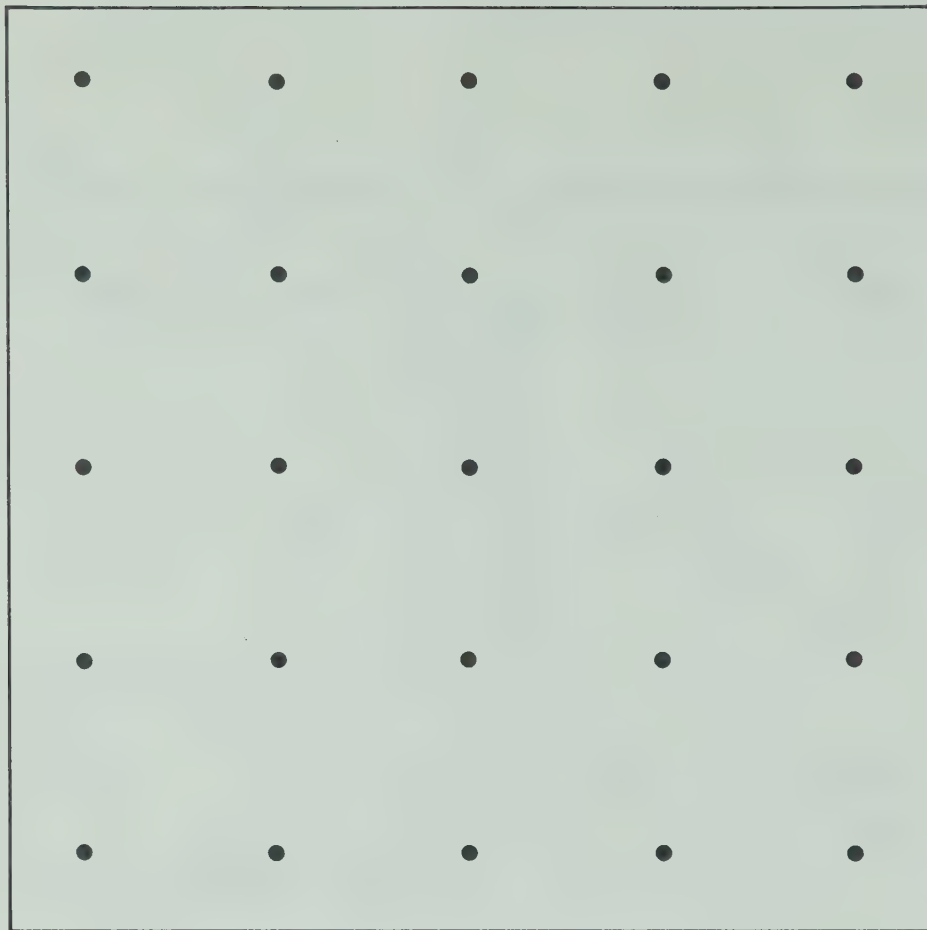
Square Pyramid

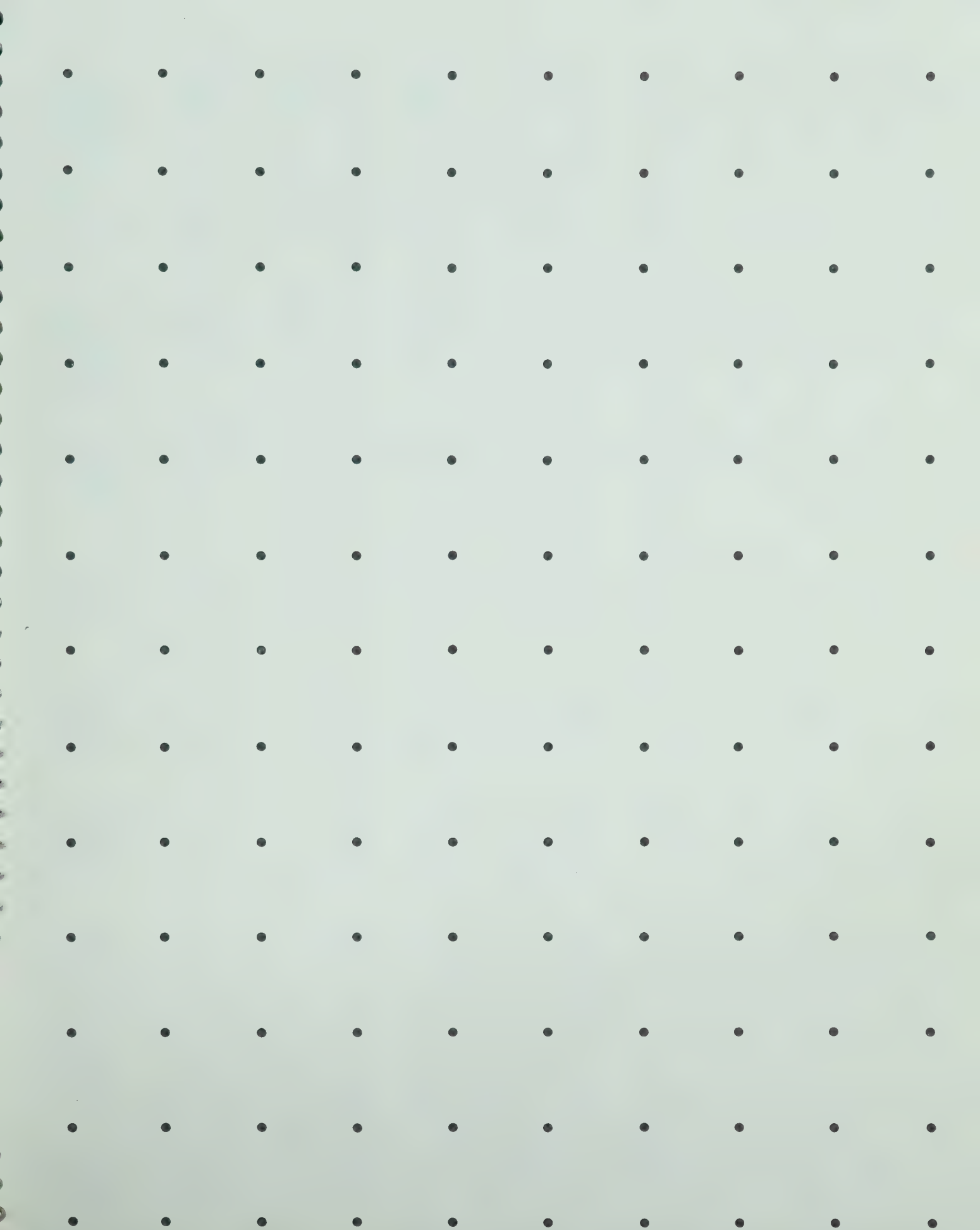


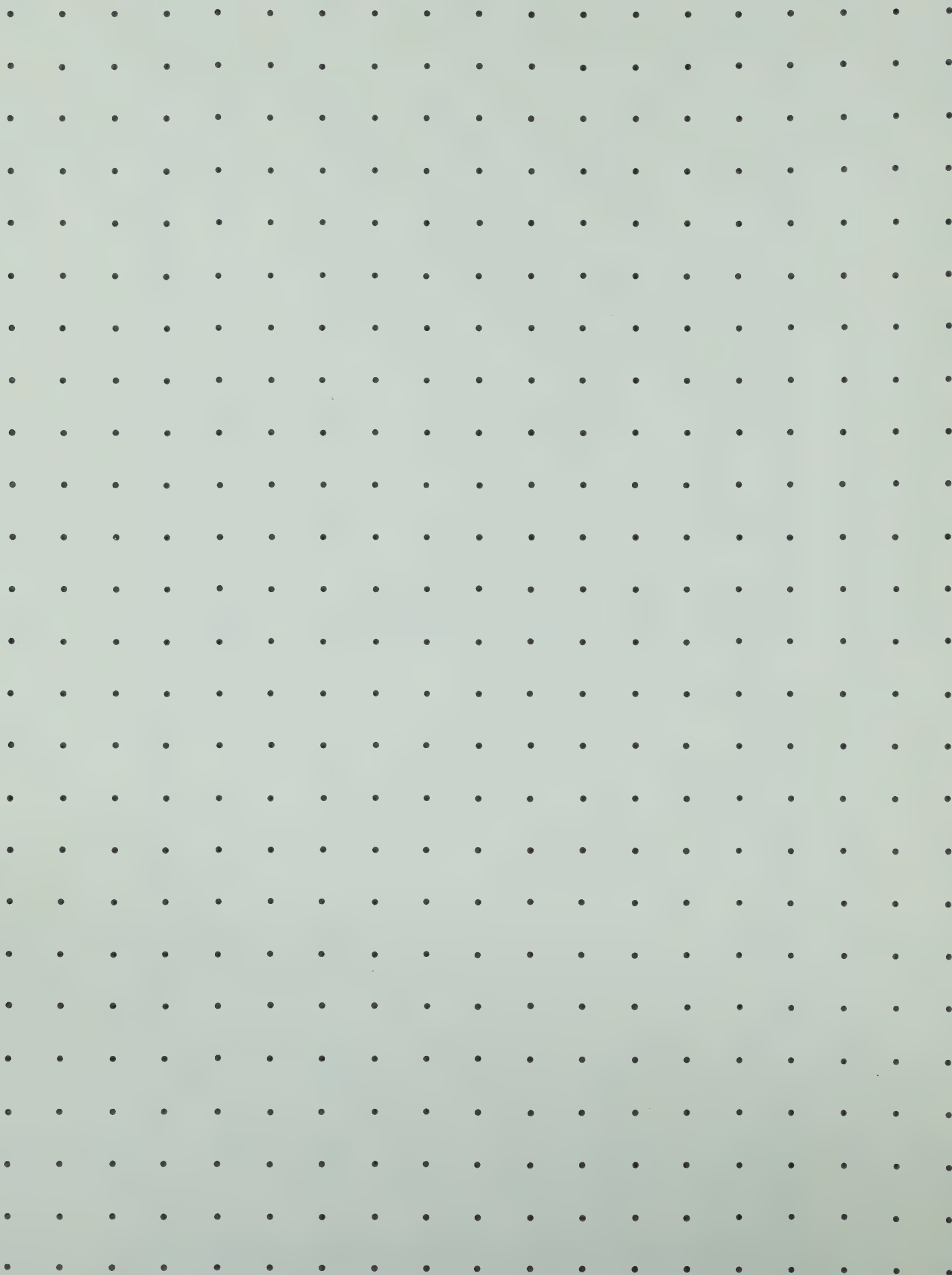
Triangular Pyramid











0											

1											

2											

3											

4											

5											

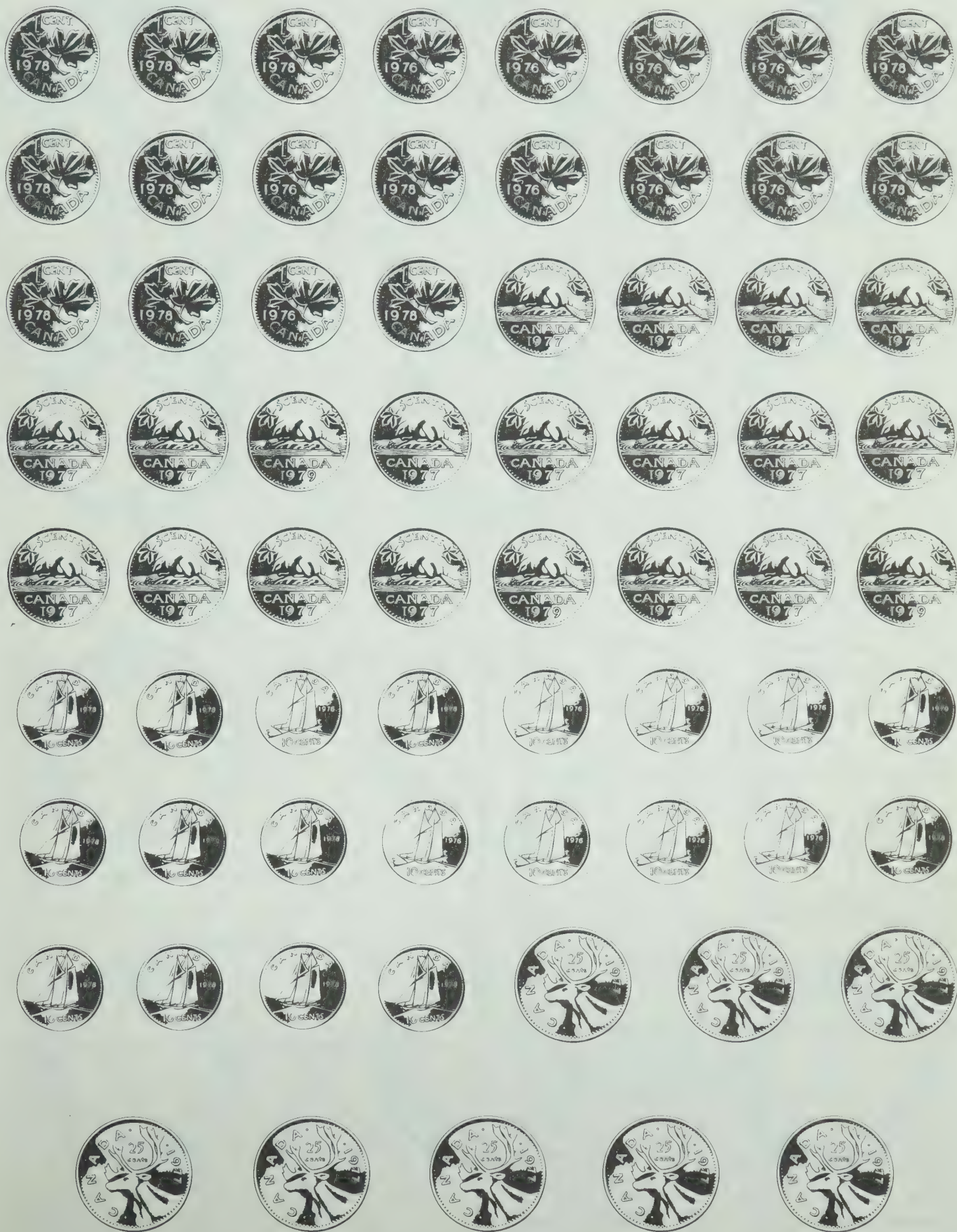
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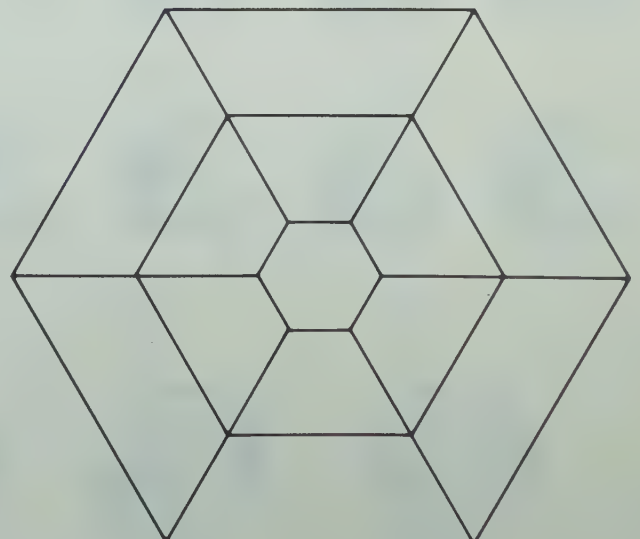
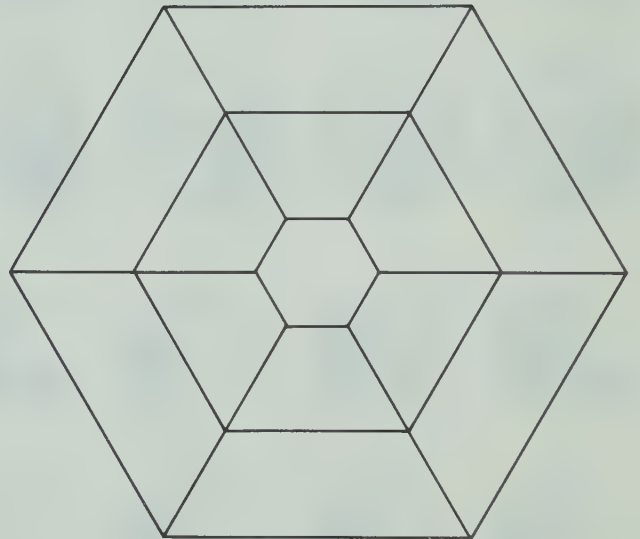
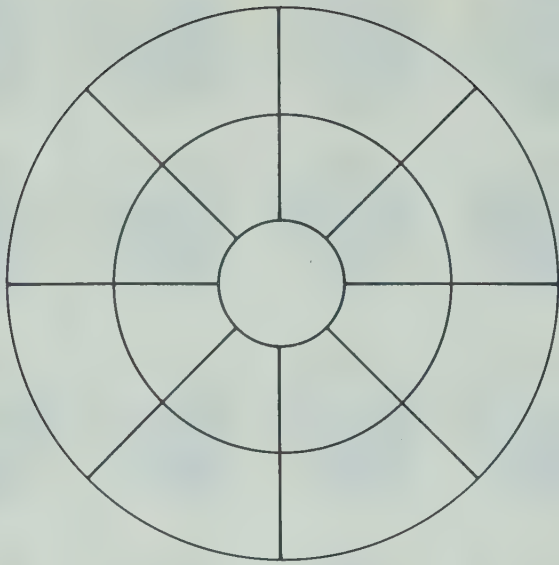
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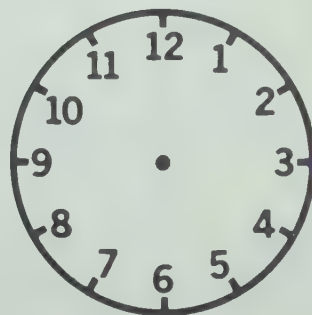
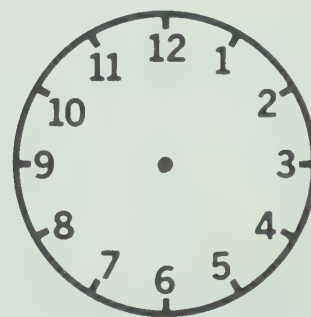
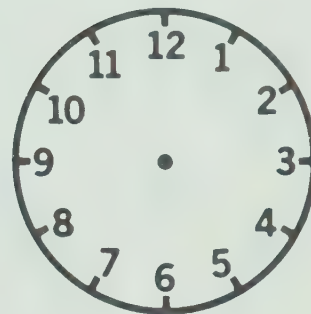
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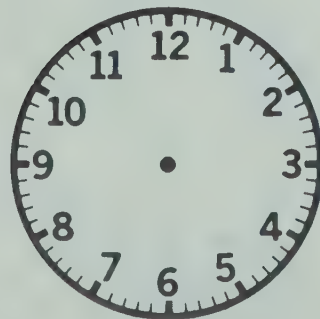
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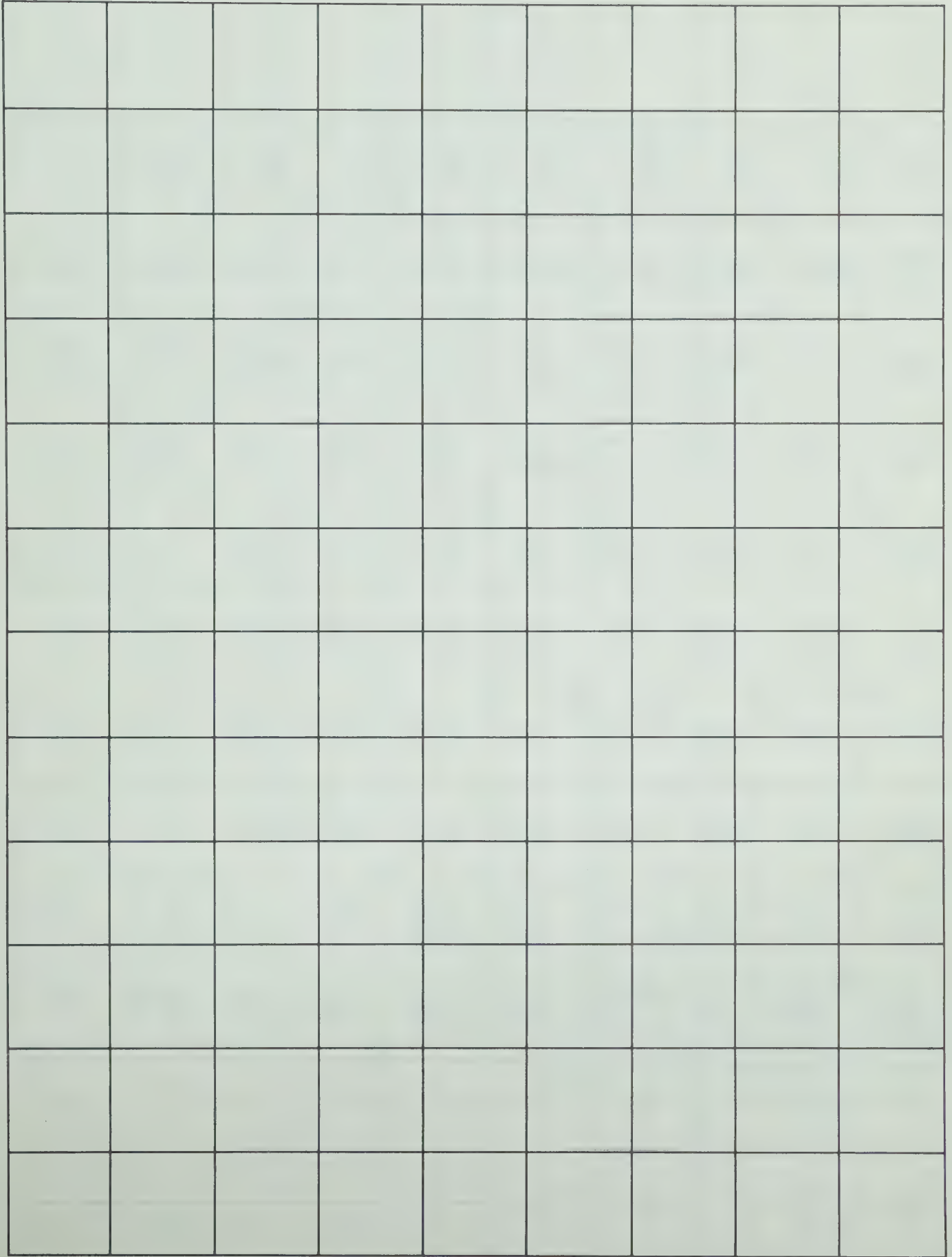


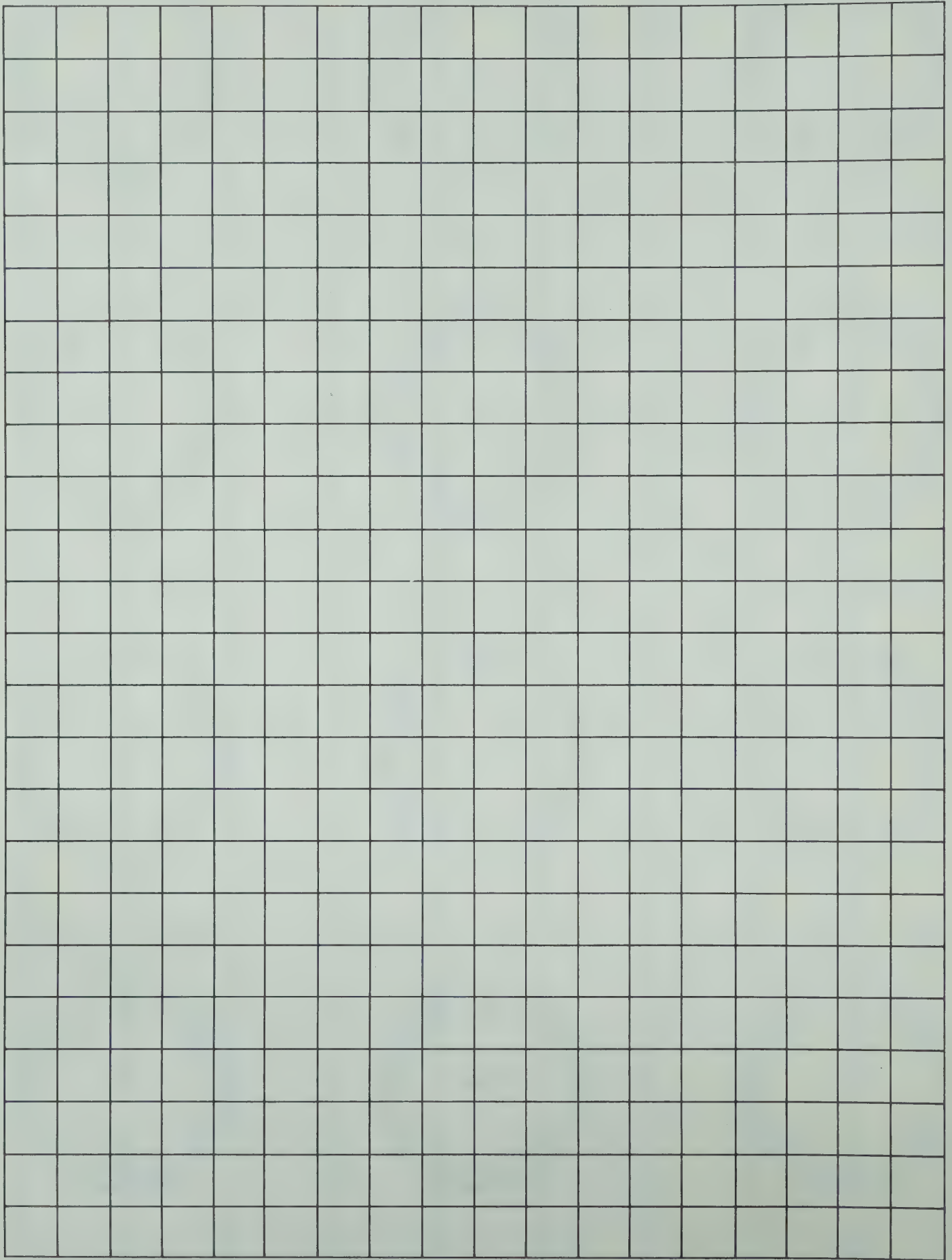






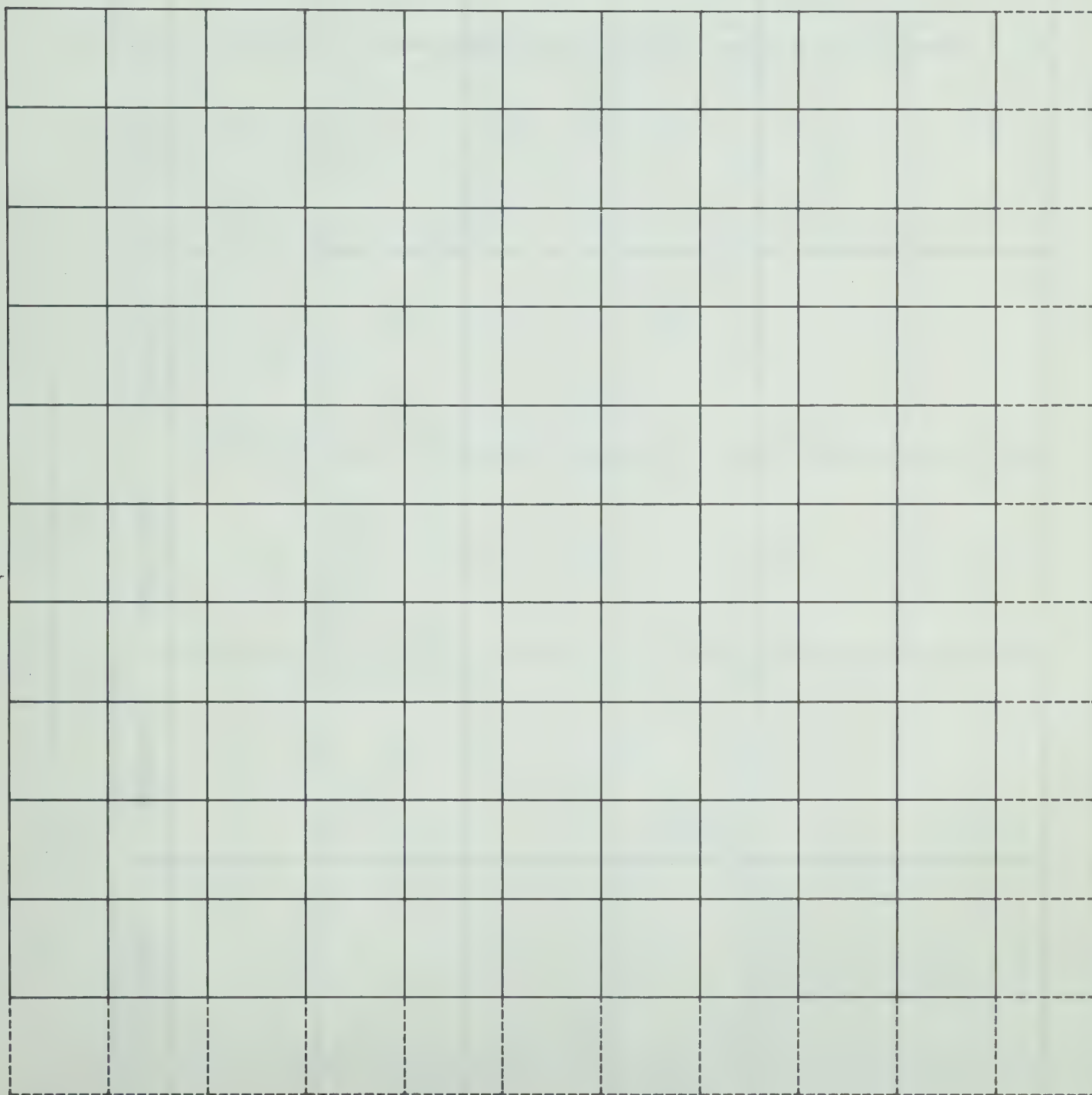




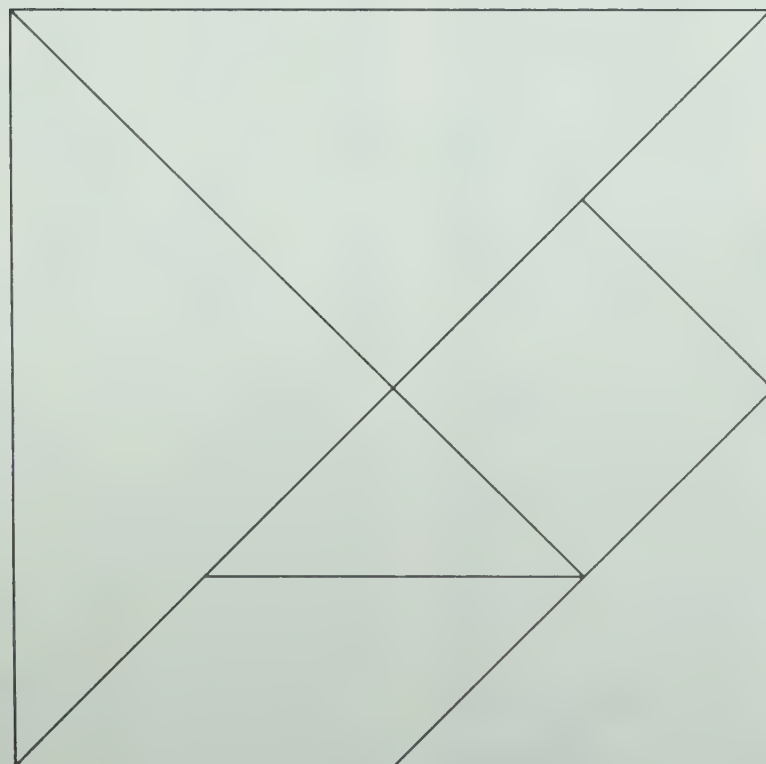
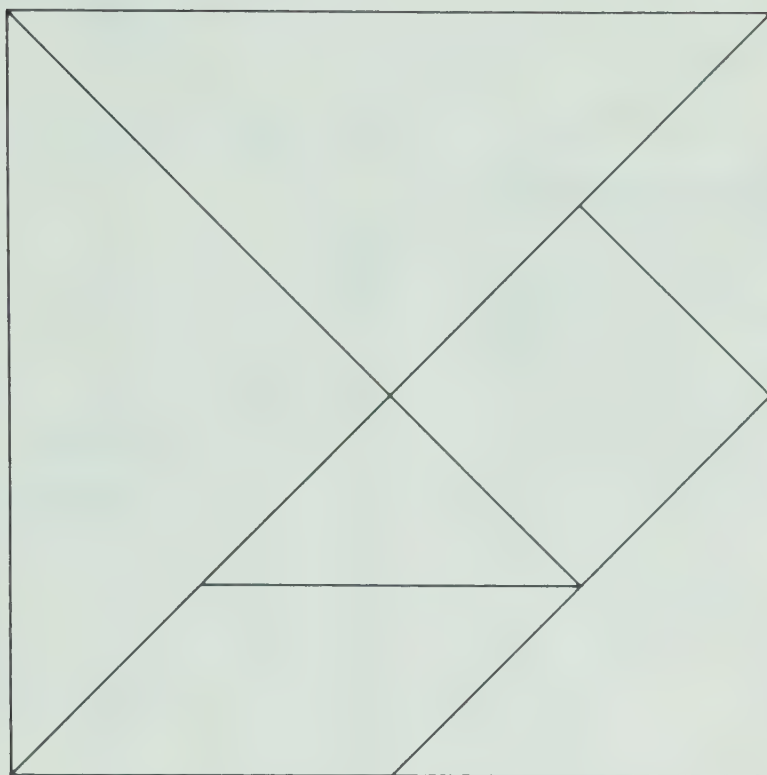


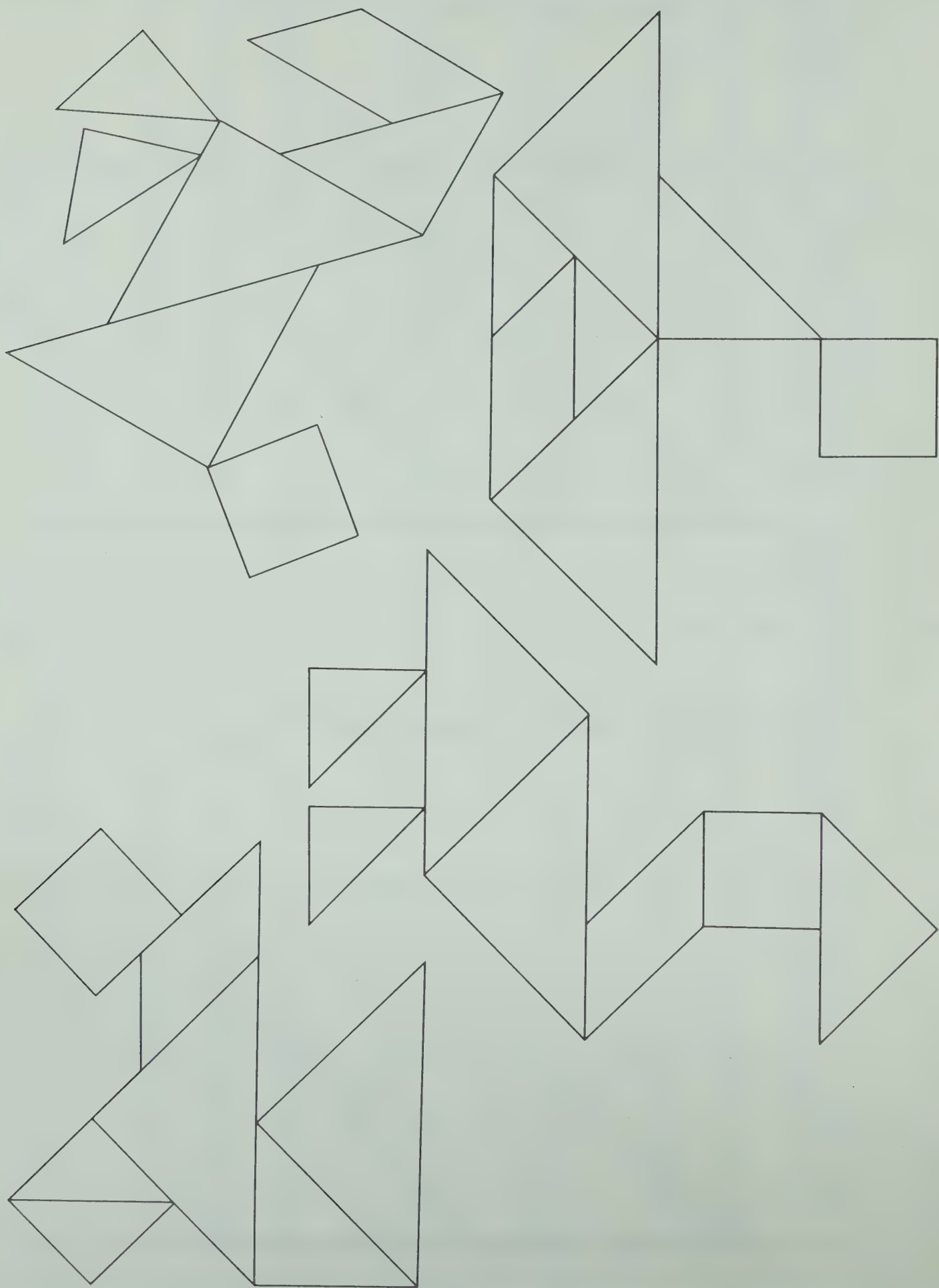
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

+	0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9	10
2	2	3	4	5	6	7	8	9	10	11
3	3	4	5	6	7	8	9	10	11	12
4	4	5	6	7	8	9	10	11	12	
5	5	6	7	8	9	10	11	12		
6	6	7	8	9	10	11	12			
7	7	8	9	10	11	12				
8	8	9	10	11	12					
9	9	10	11	12						



[illegible]





Name _____

Numeration

1. Counts by ones to 99 ☐
2. Reads numerals to 99 ☐
3. Counts by fives to 60 ☐
4. Counts by tens to 90 ☐
5. Counts by twos to 20 ☐
6. Writes numerals to 99 ☐
7. Understands sequence of numbers to 99 ☐
8. Orders numbers to 99 ☐
9. Interprets two-place numerals, to 99 ☐
10. Understands expanded form, to 99 ☐
11. Counts backward by ones ☐
12. Reads number words to *ten* ☐
13. Uses ordinal names to *ninth* ☐
14. Continues number patterns ☐
15. Knows meaning and use of the symbols:
 - a. $\$$ ☐
 - b. $=$ ☐
 - c. $+$ ☐
 - d. $-$ ☐
16. Understands the terms:
 - a. more than ☐
 - b. fewer than ☐
 - c. greater than ☐
 - d. less than ☐
 - e. equals ☐
 - f. one more ☐
 - g. one fewer ☐
 - h. one greater ☐
 - i. one less ☐
 - j. after ☐
 - k. before ☐
 - l. between ☐
17. Recognizes
 - a. one-half of a whole ☐
 - b. one-fourth of a whole ☐
 - c. one-half of a set ☐

Operations

Sets

1. Understands meaning of a set ☐
2. Sorts objects into sets ☐
3. Compares sets ☐
4. Makes sets ☐
5. Partitions sets ☐
6. Completes sets ☐
7. Joins sets ☐
8. Removes members from a set ☐

Addition

1. Understands the operation ☐
2. Completes addition sentences ☐

3. Identifies additive situations ☐
4. Writes addition sentences ☐
5. Illustrates addition sentences ☐
6. Completes vertical form ☐
7. Understands zero as an addend ☐
8. Adds three numbers ☐
9. Uses the properties of addition:
 - a. commutative (order) ☐
 - b. associative (grouping) ☐
10. Knows the facts for sums of
 - a. 1 ☐
 - b. 2 ☐
 - c. 3 ☐
 - d. 4 ☐
 - e. 5 ☐
 - f. 6 ☐
 - g. 7 ☐
 - h. 8 ☐
 - i. 9 ☐
 - j. 10 ☐
 - k. 11 ☐
 - l. 12 ☐
11. Writes families of facts ☐

Subtraction

1. Understands the operation:
 - a. remainder ☐
 - b. how many more (difference) ☐
2. Completes subtraction sentences ☐
3. Identifies subtractive situations ☐
4. Writes subtraction sentences ☐
5. Illustrates subtraction sentences ☐
6. Completes vertical form ☐
7. Understands zero as a
 - a. subtrahend ☐
 - b. remainder / difference ☐
8. Relates subtraction to addition ☐
9. Knows the facts for minuends of
 - a. 1 ☐
 - b. 2 ☐
 - c. 3 ☐
 - d. 4 ☐
 - e. 5 ☐
 - f. 6 ☐
 - g. 7 ☐
 - h. 8 ☐
 - i. 9 ☐
 - j. 10 ☐
 - k. 11 ☐
 - l. 12 ☐
10. Writes families of facts ☐

Multiplication

1. Understands repeated addition ☐

Division

1. Shares between two ☐

5. Knows number of days in a week ☐

6. Knows days of week in order ☐

Measurement

Area

1. Compares areas using non-standard units ☐
2. Counts unit squares ☐
3. Draws shapes having given size ☐

Capacity

1. Compares capacities using non-standard units ☐
2. Understands the terms:
a. holds more ☐
b. holds less ☐
c. holds the same amount ☐

Length

1. Compares lengths using non-standard units ☐
2. Understands the terms:
a. longer than ☐
b. shorter than ☐
c. the same length ☐
d. metre ☐
3. Measures in non-standard units ☐
4. Measures in metres ☐

Mass

1. Compares masses using non-standard units ☐
2. Understands the terms:
a. heavier than ☐
b. lighter than ☐
c. as heavy as ☐

Money

1. Knows coins and their values:
a. penny ☐
b. nickel ☐
c. dime ☐
d. quarter ☐
2. Makes change, to 10 cents ☐
3. Counts money using dimes, to 90 cents ☐
4. Reads money notation, to 50 cents ☐
5. Counts money using mixed coins, amounts to 50 cents ☐
6. Chooses coins for amounts to 50 cents ☐
7. Shows coins for amounts to 50 cents ☐
8. Recognizes sets of coins having the same value ☐
9. Adds values, to 12 cents ☐
10. Subtracts values, to 10 cents ☐

Time

1. Recognizes parts of the day ☐
2. Tells time, to the hour ☐
3. Tells time, to the half-hour ☐
4. Reads names of days ☐

Graphing

1. Completes a simple bar graph ☐
2. Interprets a simple bar graph ☐

Problem Solving

1. Completes number sentences ☐
2. Writes number sentences ☐
3. Interprets pictures ☐
4. Illustrates problems ☐
5. Chooses the correct operation ☐
6. Solves one-step problems ☐
7. Solves problems by trial and error ☐
8. Classifies information ☐

Geometry

1. Recognizes plane shapes:
a. circle ☐
b. rectangle ☐
c. square ☐
d. triangle ☐
2. Classifies plane shapes ☐
3. Recognizes in plane shapes:
a. similarities ☐
b. differences ☐
4. Copies patterns of shapes ☐
5. Continues patterns of shapes ☐
6. Reproduces shapes on geoboard / geopaper ☐
7. Understands the terms:
a. inside ☐
b. on ☐
c. outside ☐
d. side ☐
e. corner (vertex) ☐
8. Recognizes solid shapes:
a. cone ☐
b. cube ☐
c. cylinder ☐
d. prism, rectangular ☐
e. prism, triangular ☐
f. pyramid ☐
g. sphere ☐
9. Classifies solid shapes ☐
10. Recognizes in solid shapes:
a. similarities ☐
b. differences ☐
11. Identifies the features:
a. corners (vertices) ☐
b. edges ☐
c. faces ☐
d. sides ☐
12. Recognizes line symmetry ☐
13. Completes symmetrical shapes ☐

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